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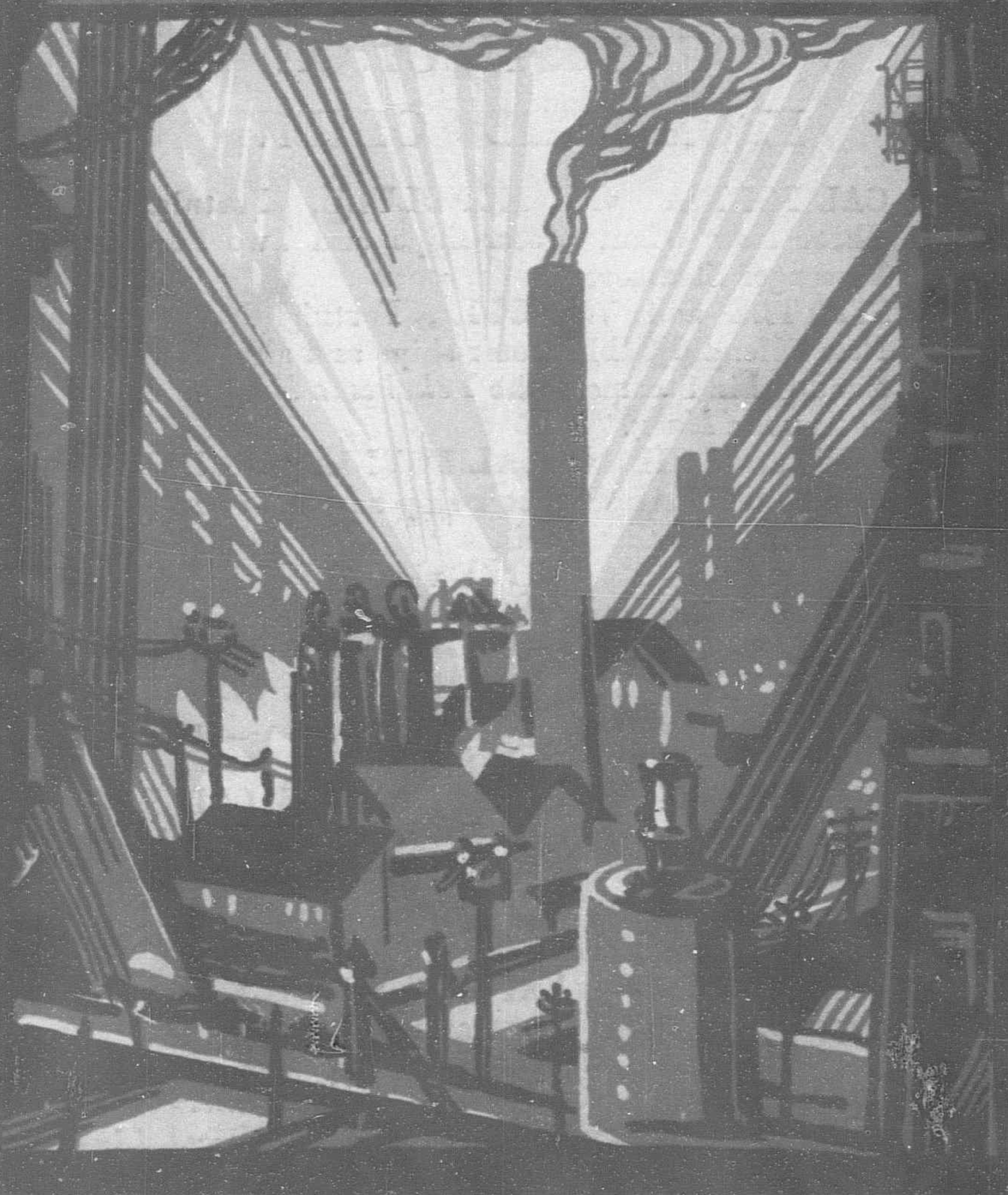

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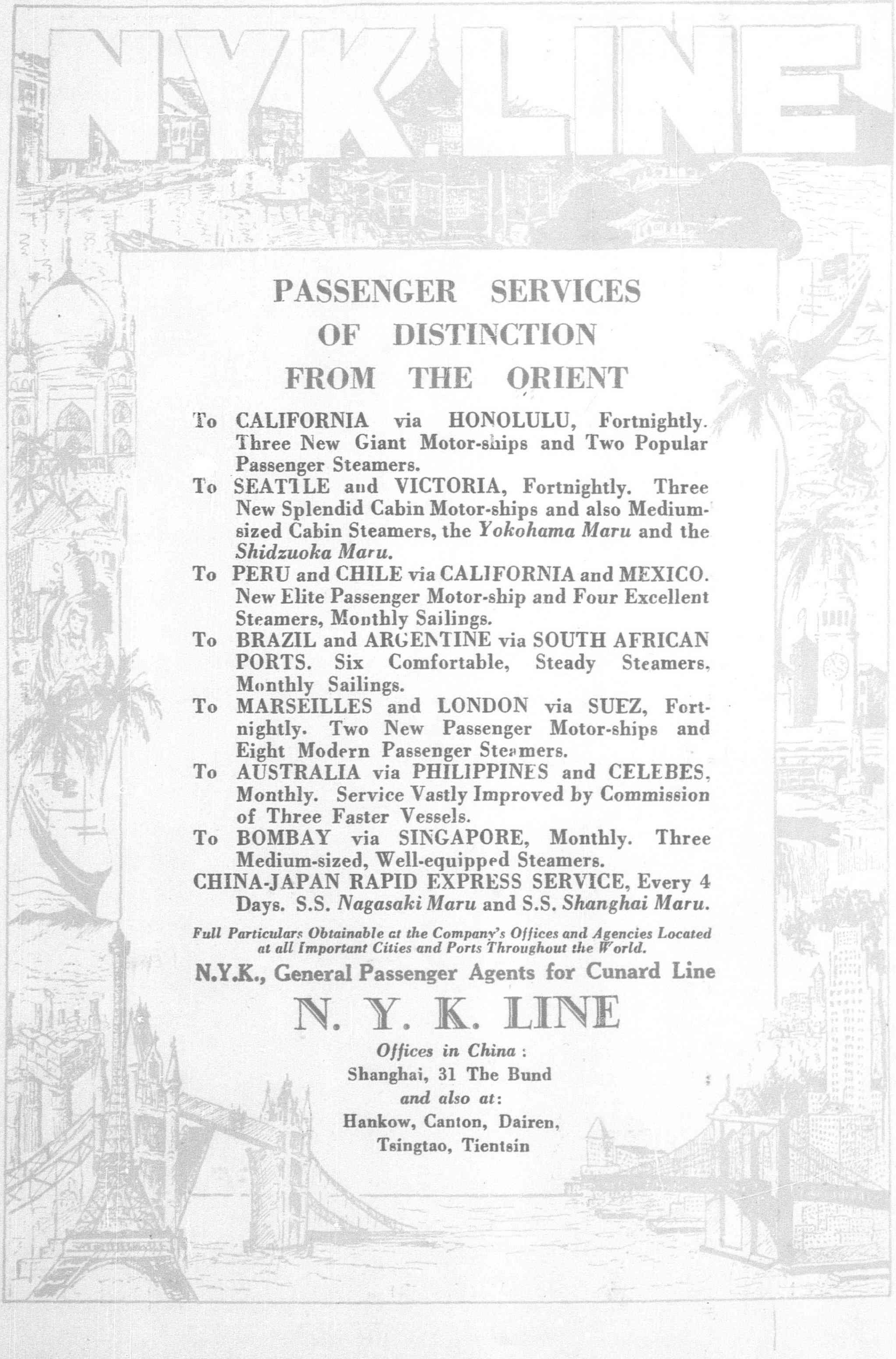
Vol. XXVII JANUARY, 1931 No. 1



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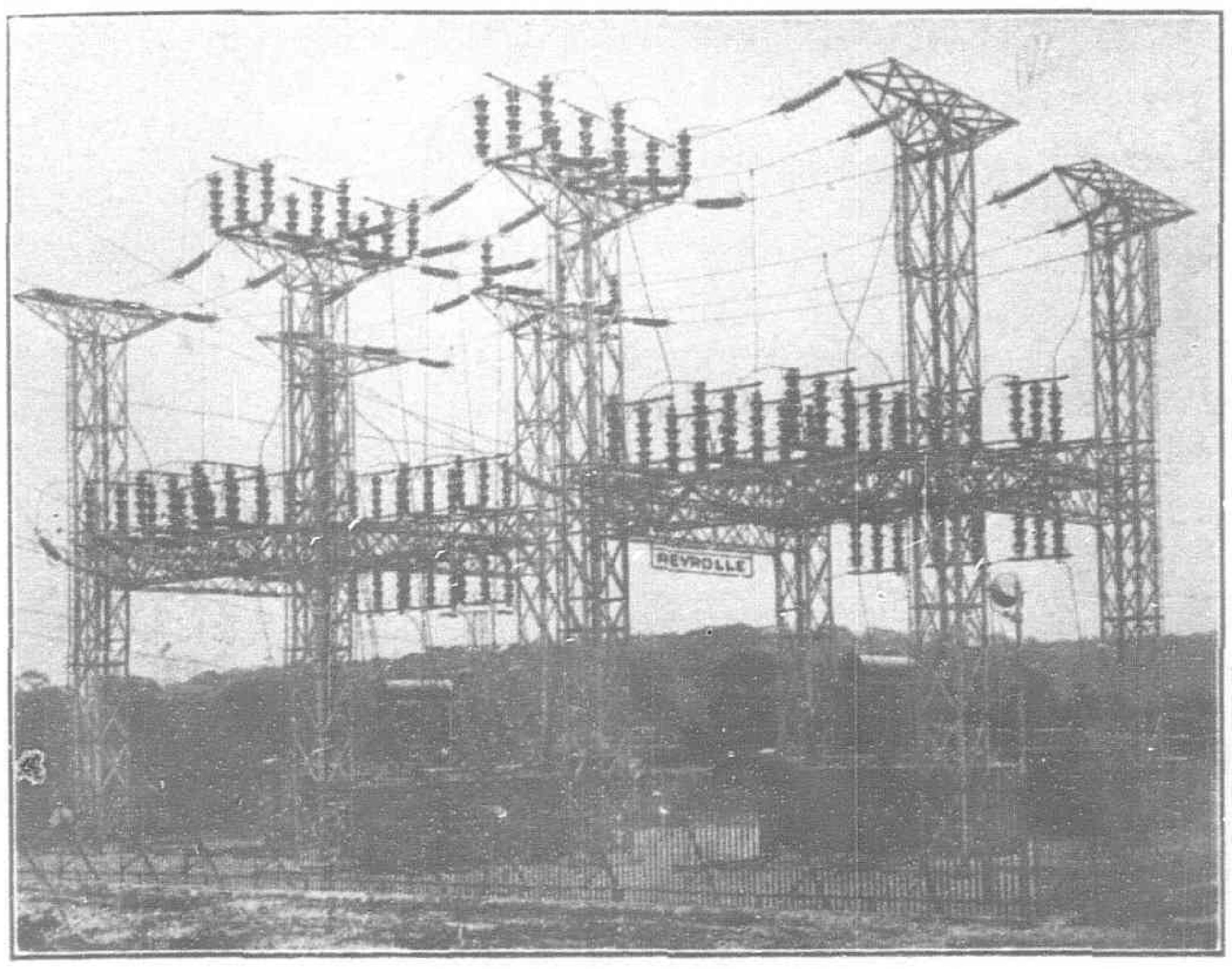

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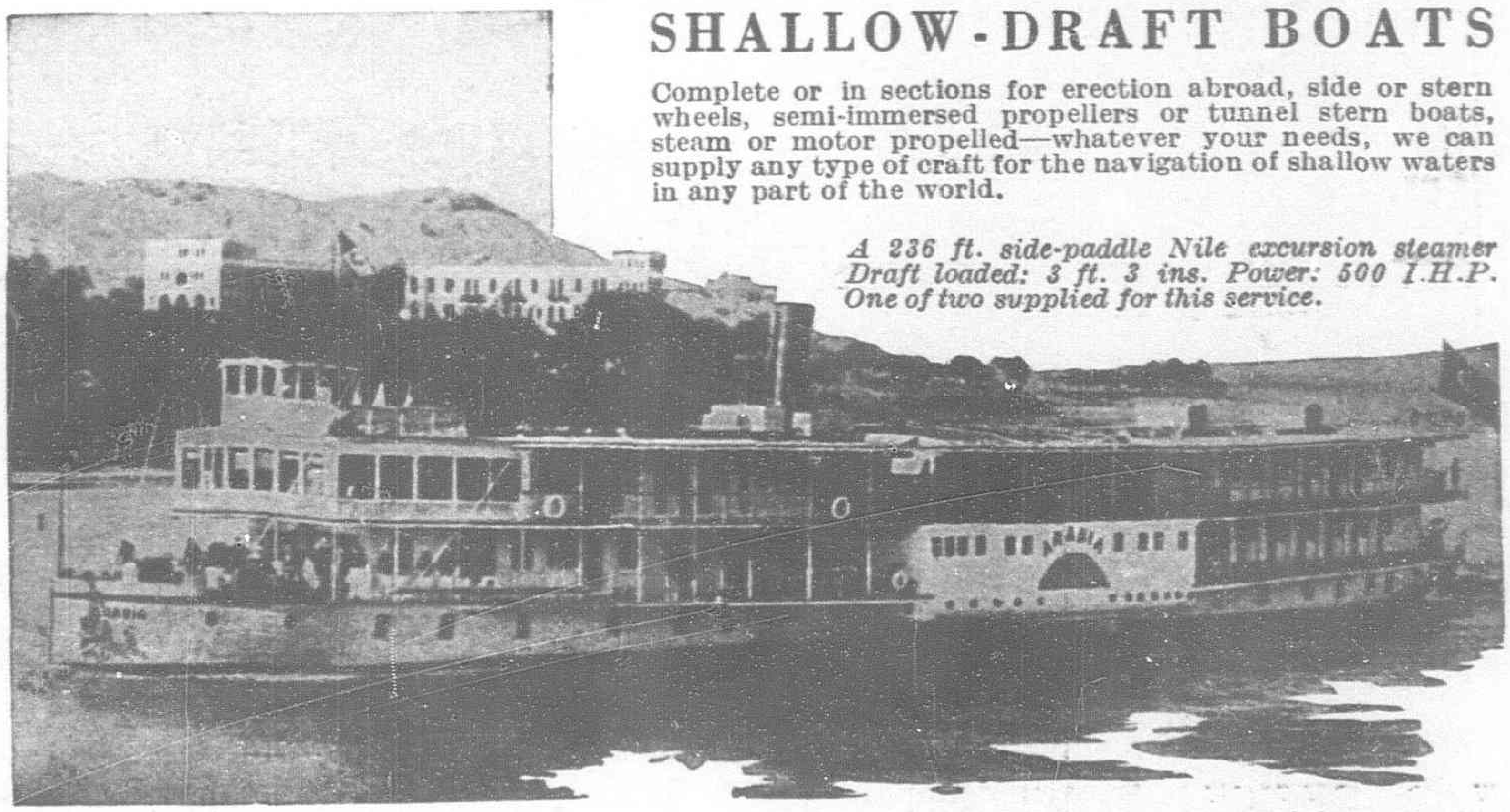

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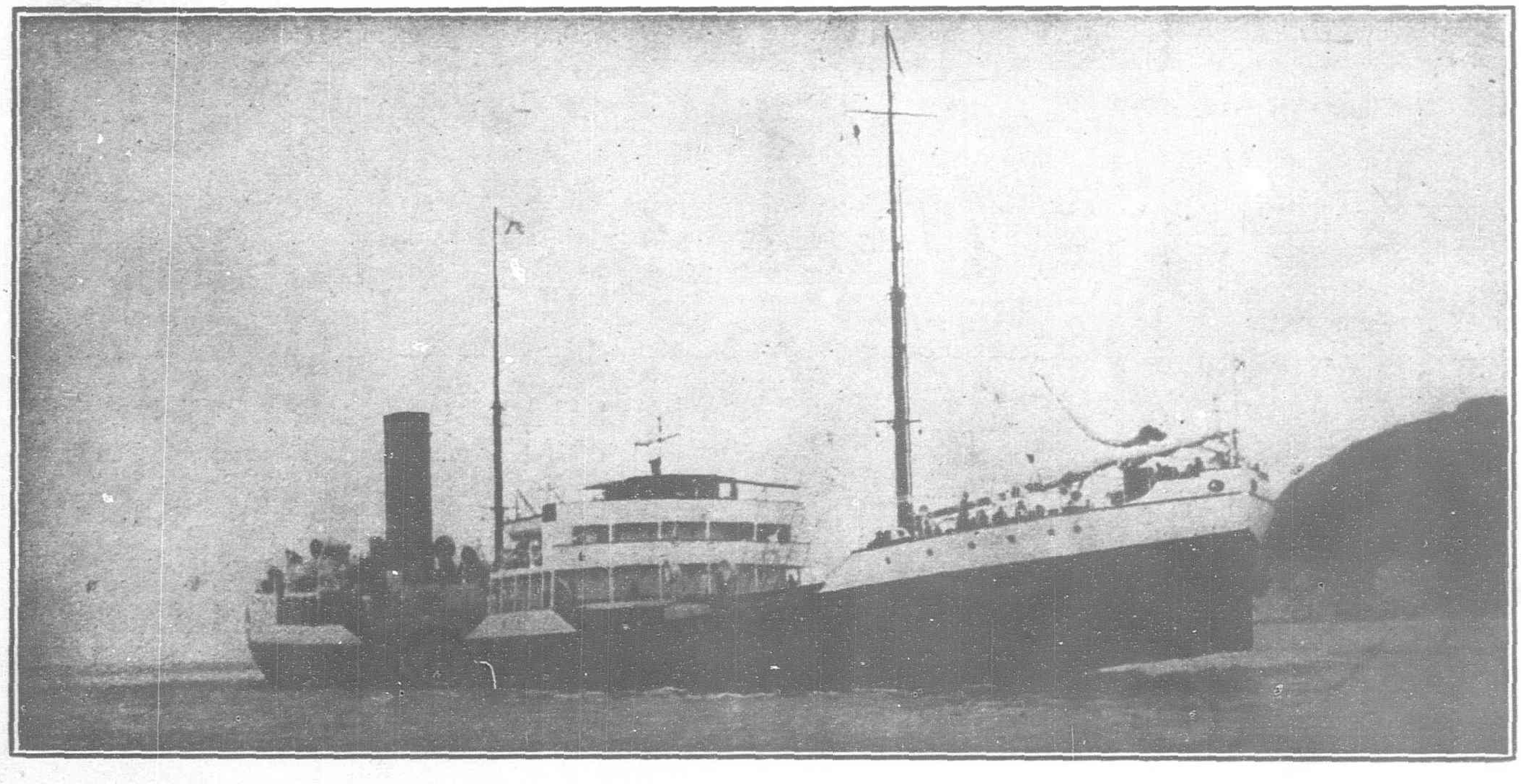

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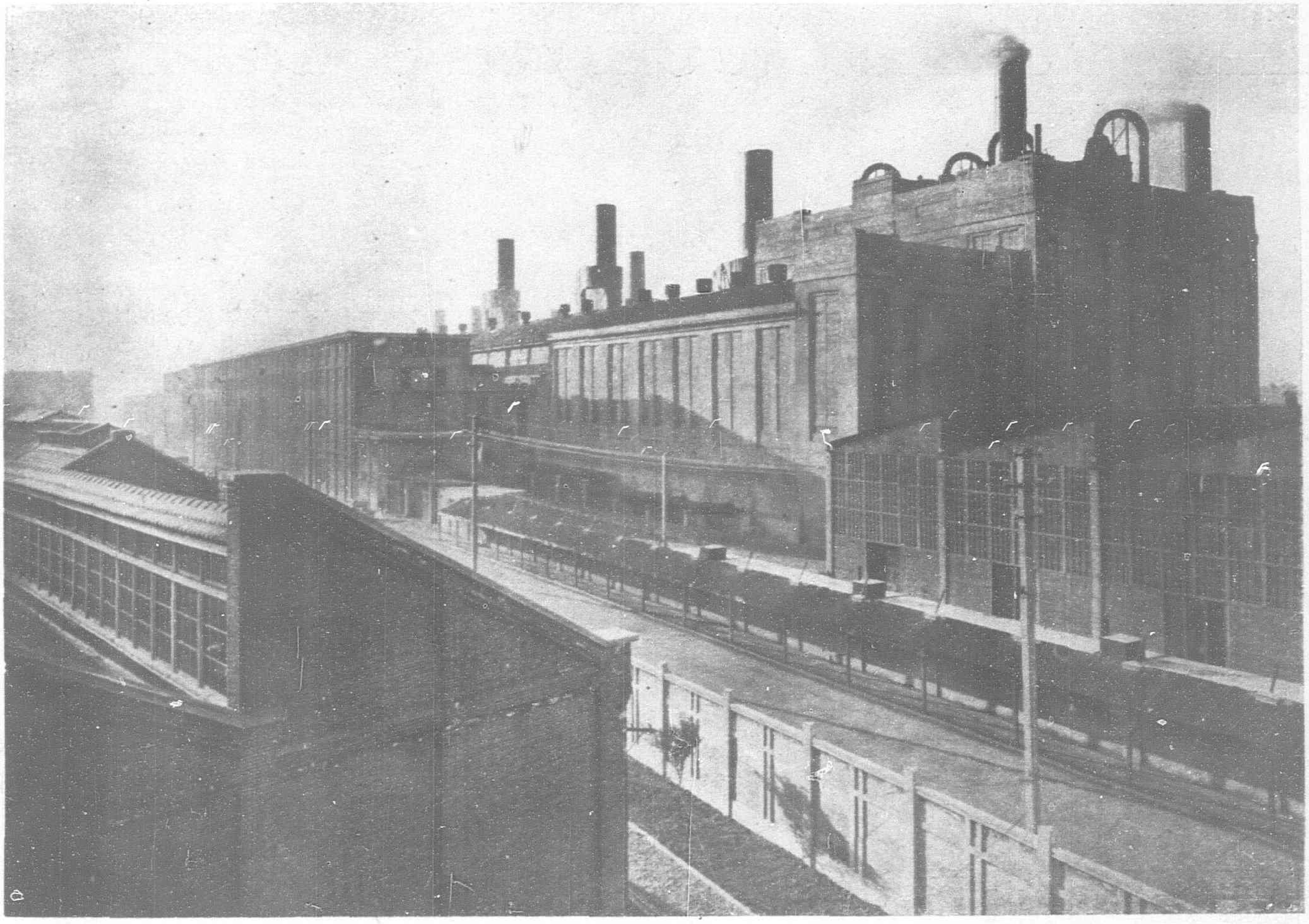

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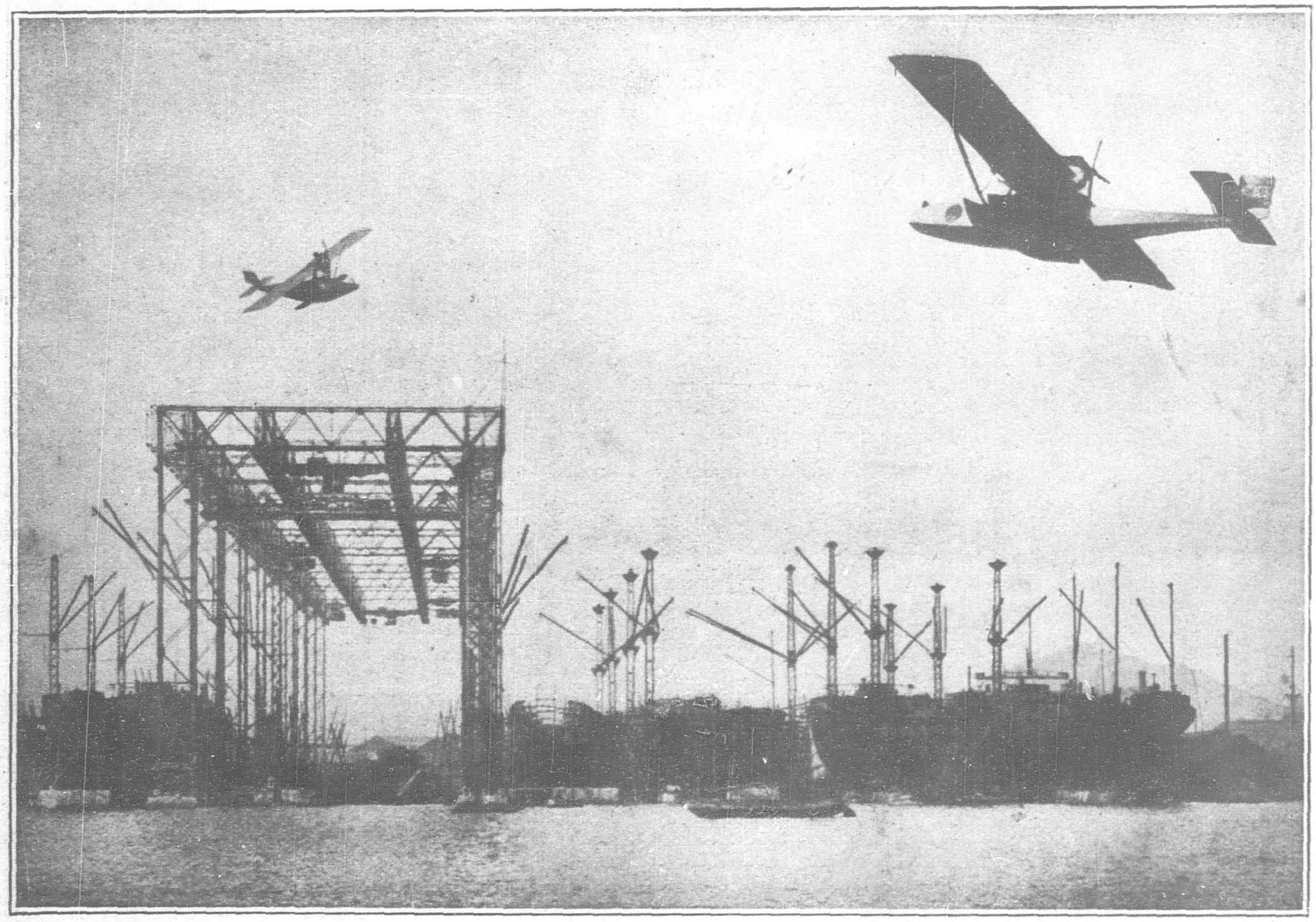

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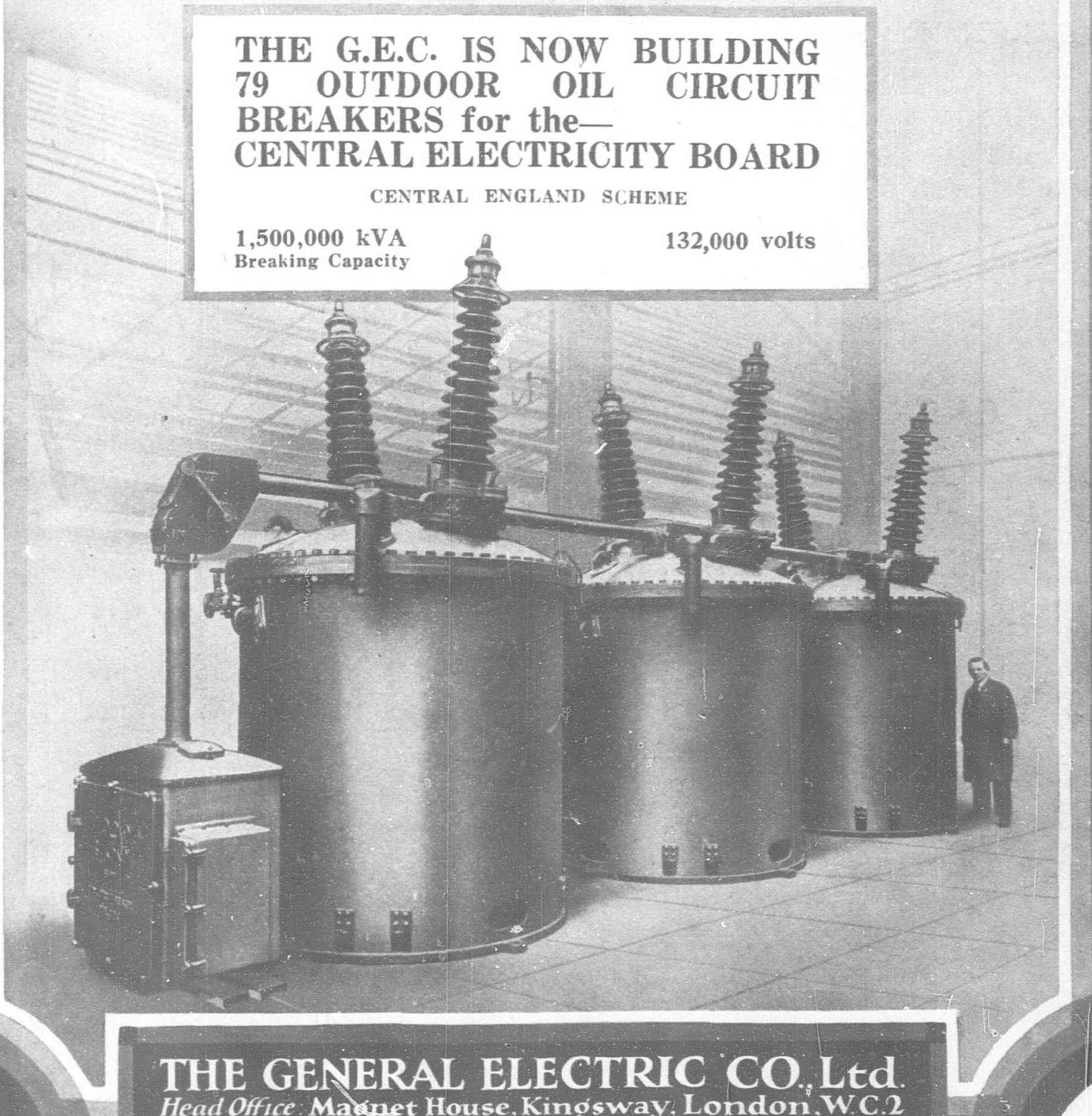

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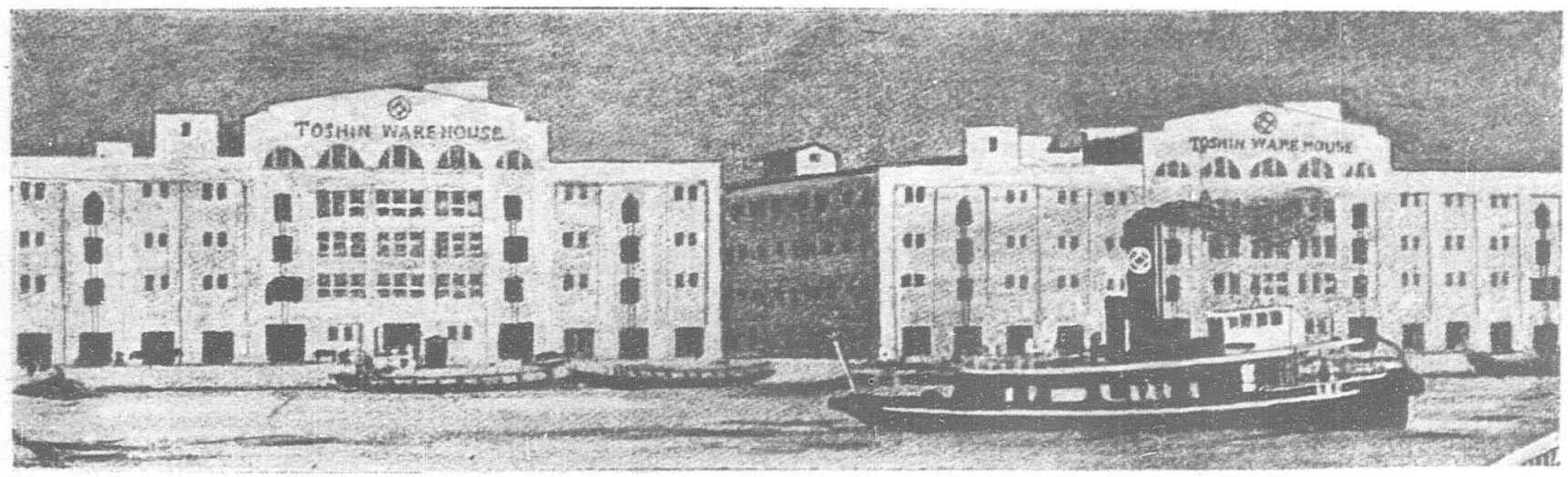

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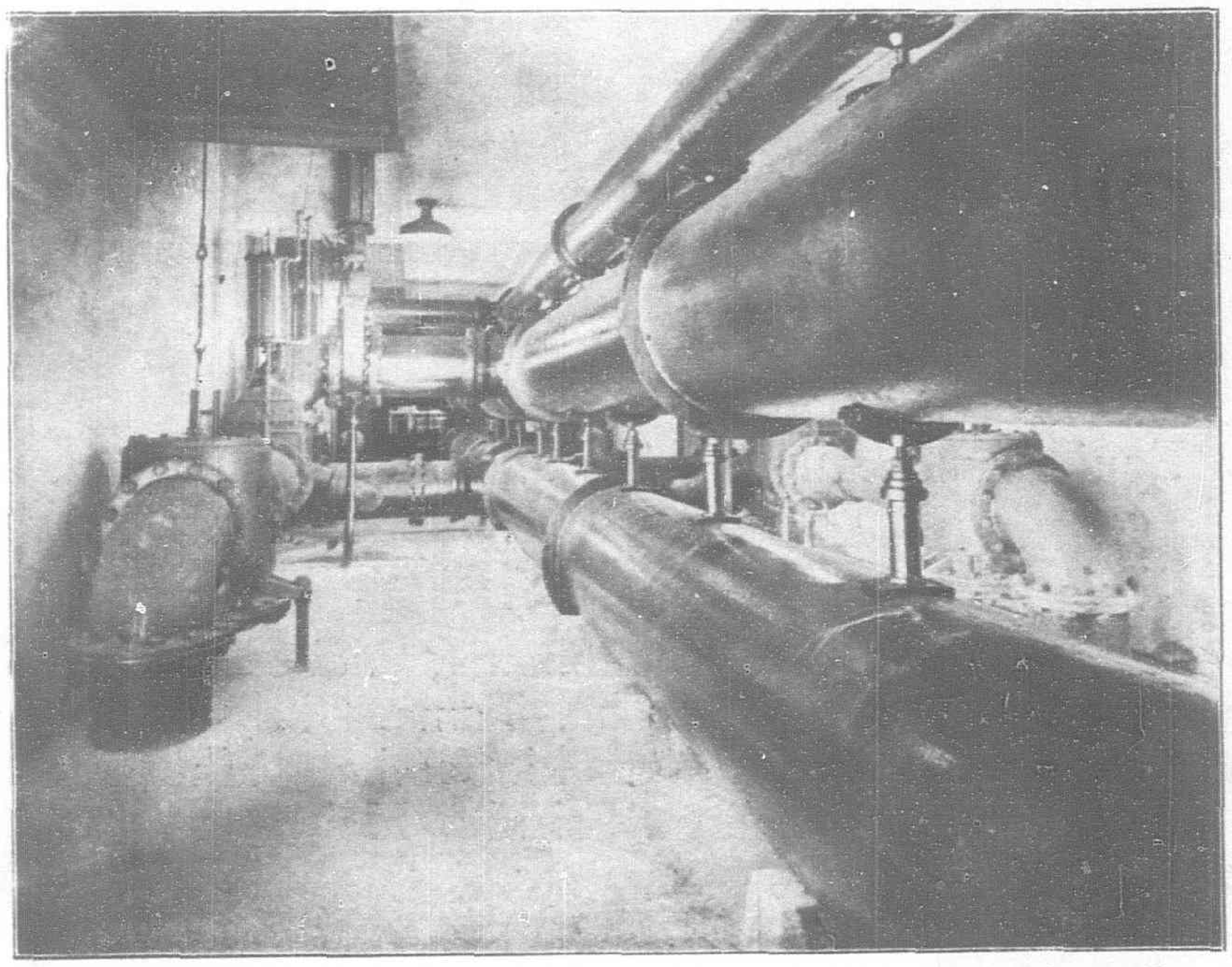

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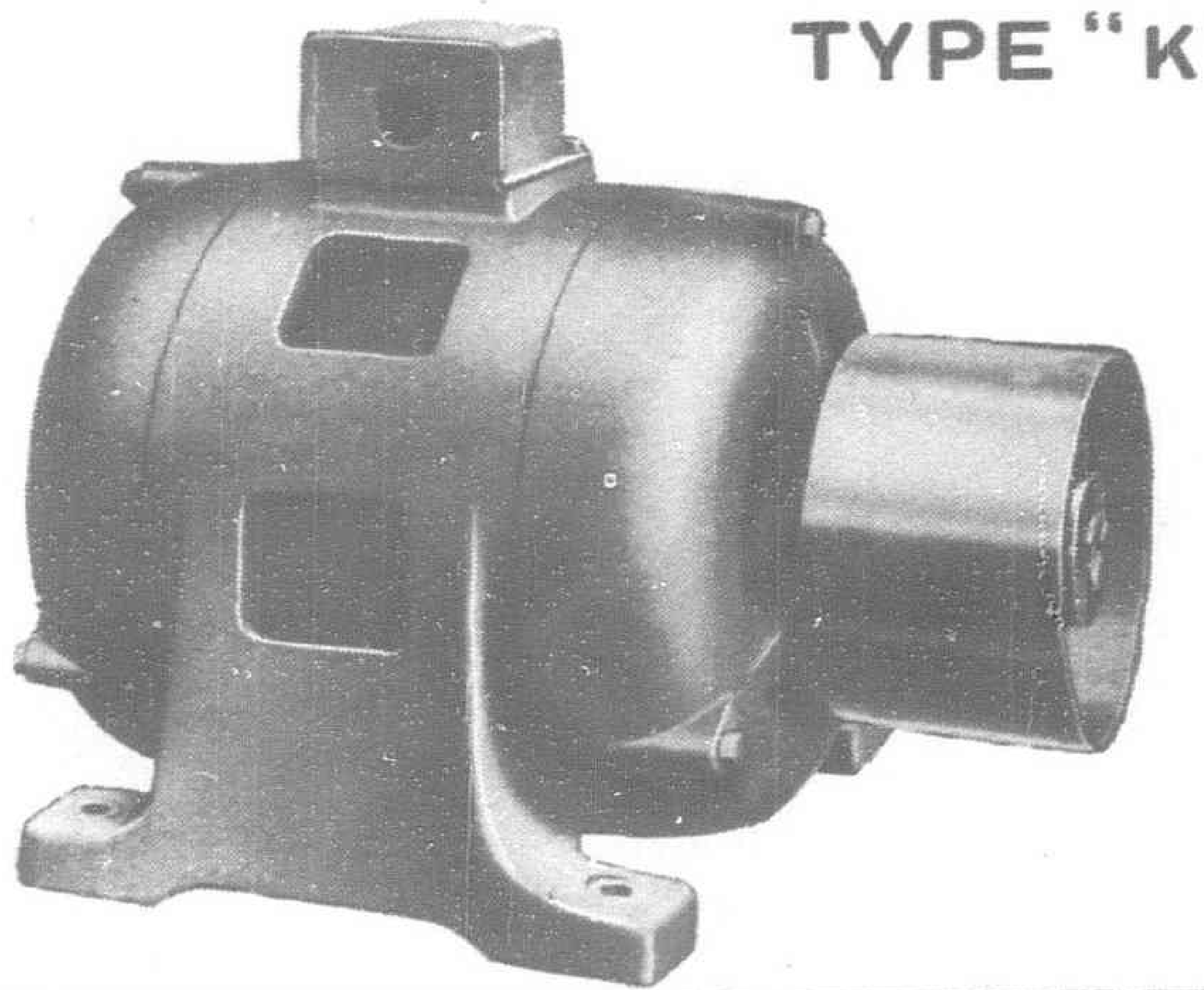
B
T-H

SQUIRREL CAGE

Motors

TYPE "K"



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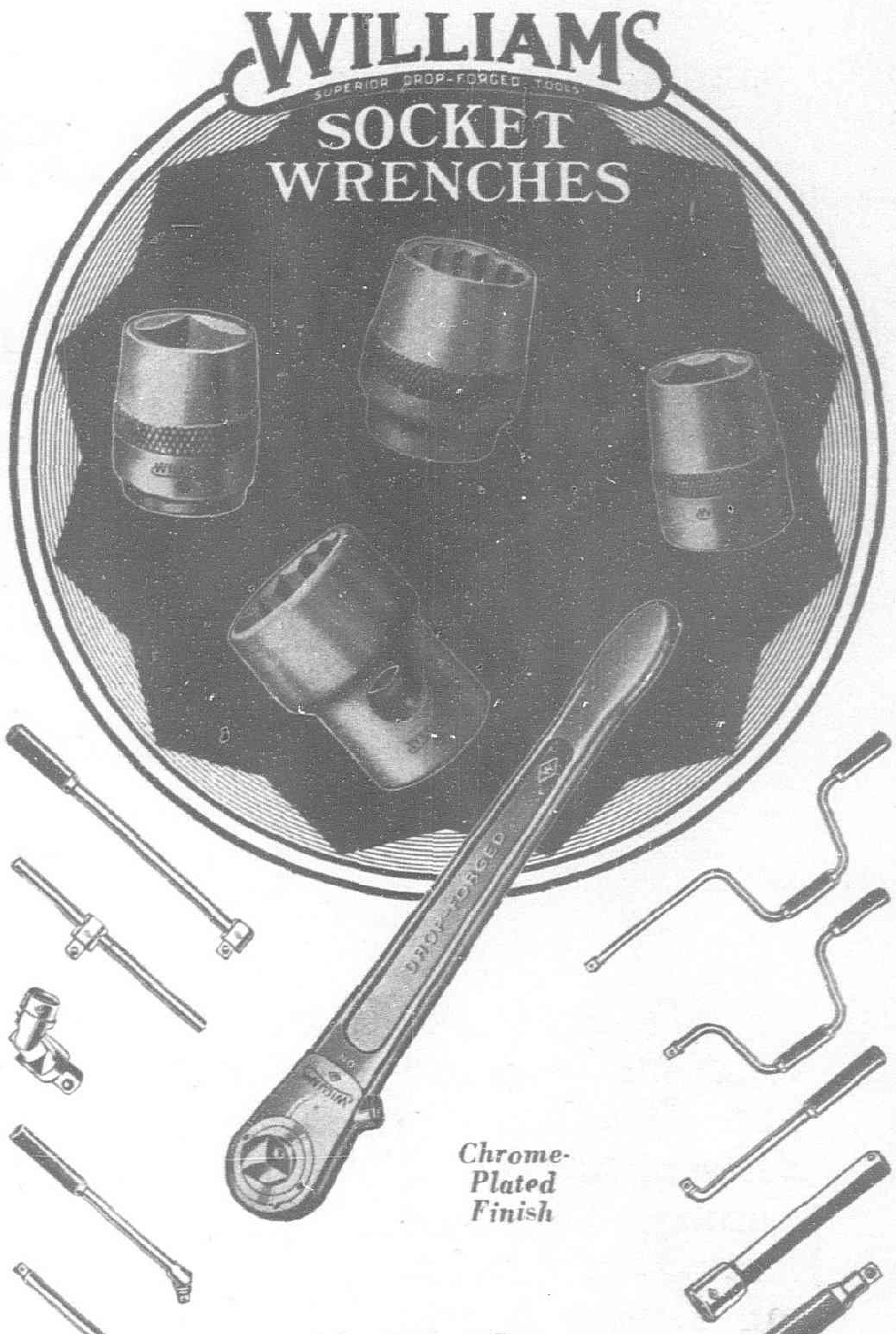

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4—W—8

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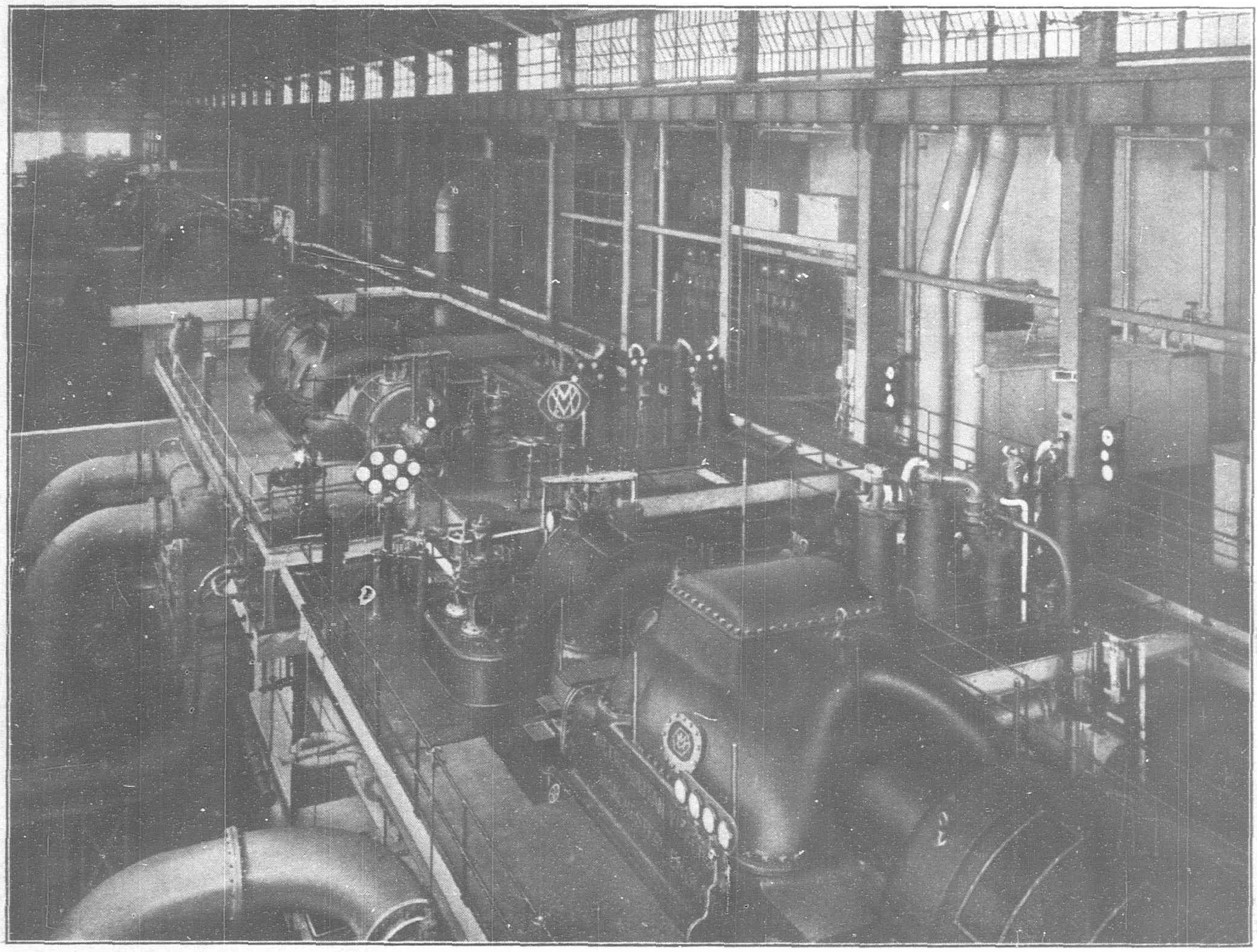

SHANGHAI The "North-China Sunday News" published a report of the wonderful efficiency achieved at the Shanghai Riverside "B" Power Station; see illustration. The figures show that during the four weeks of December, 1929 more than **26,000,000 kilowatt** hours were generated with an overall thermal efficiency of **23.55 per cent.** - - -

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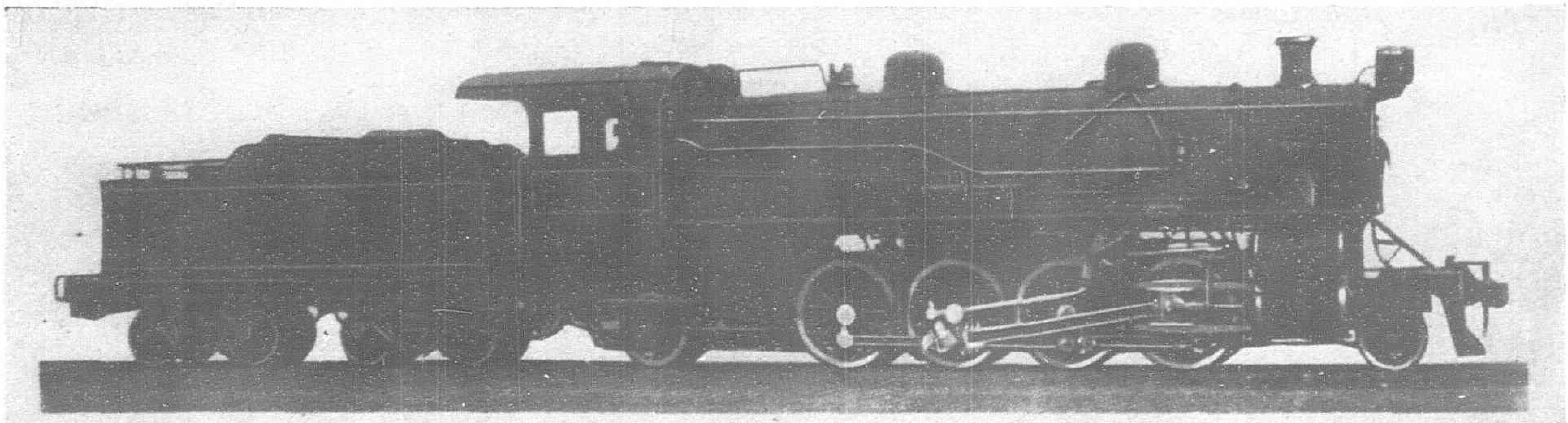

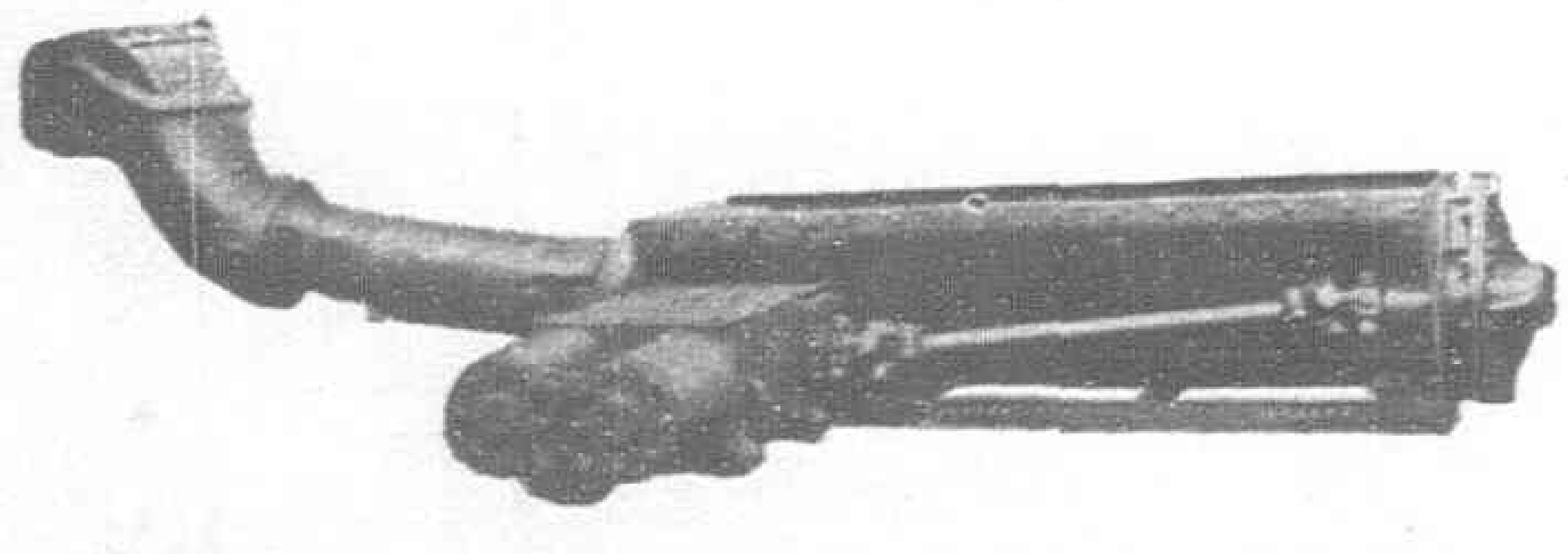

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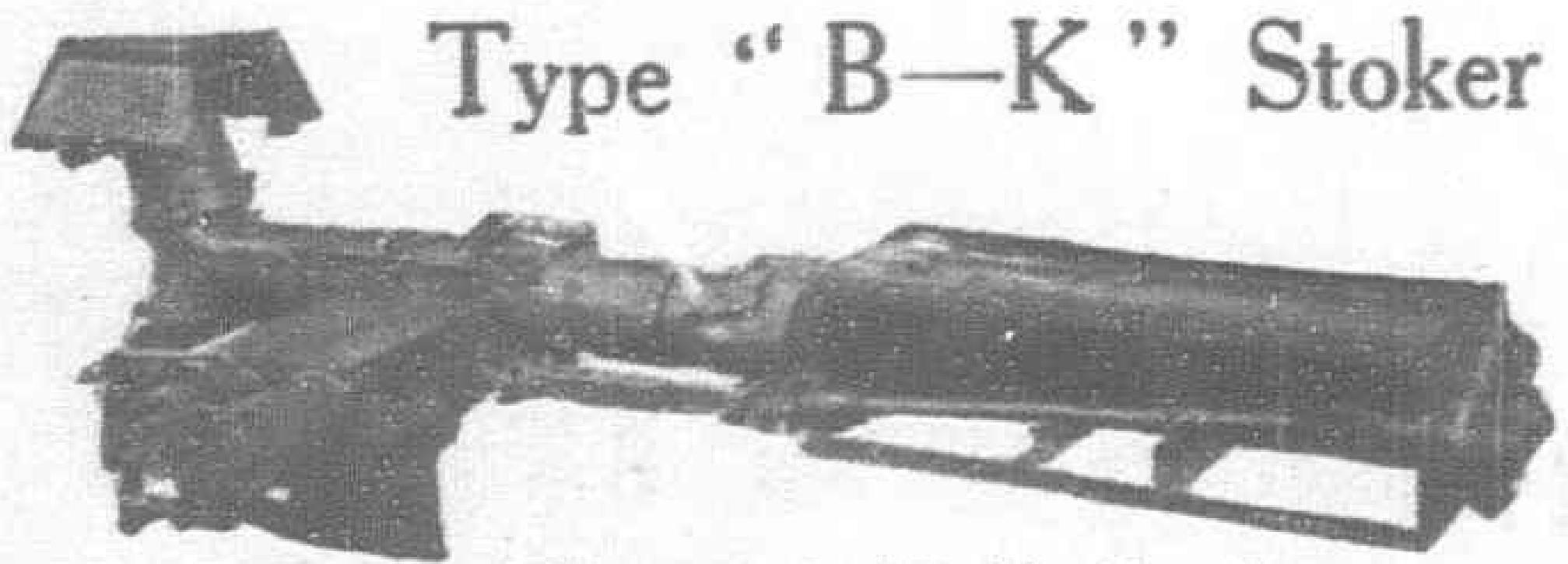

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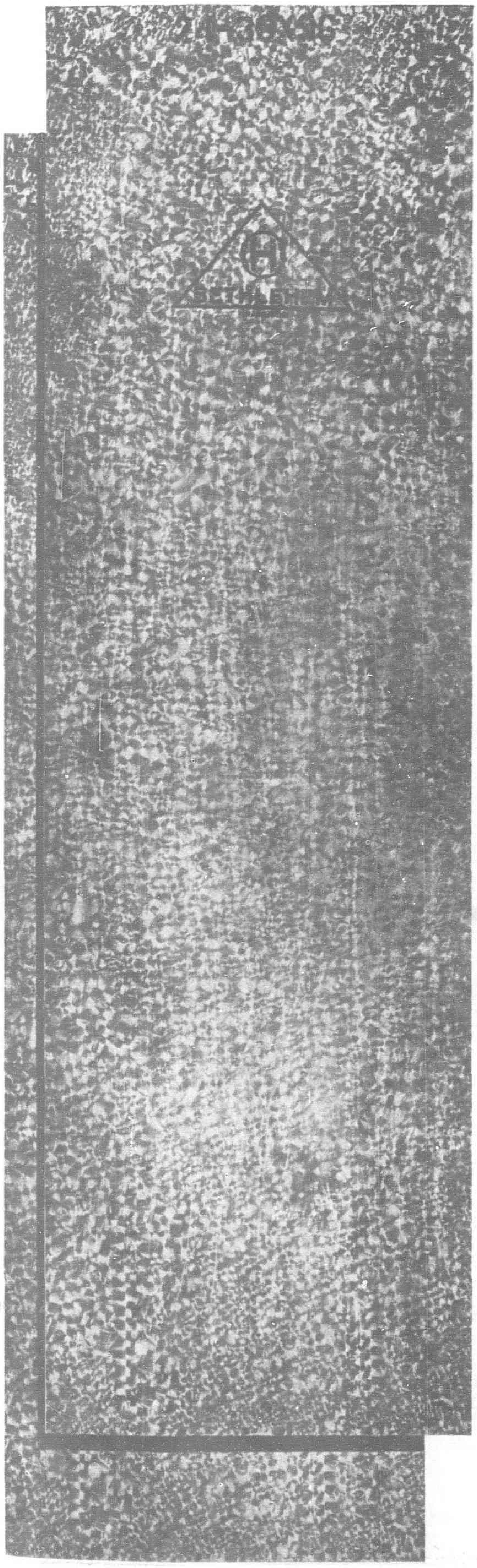

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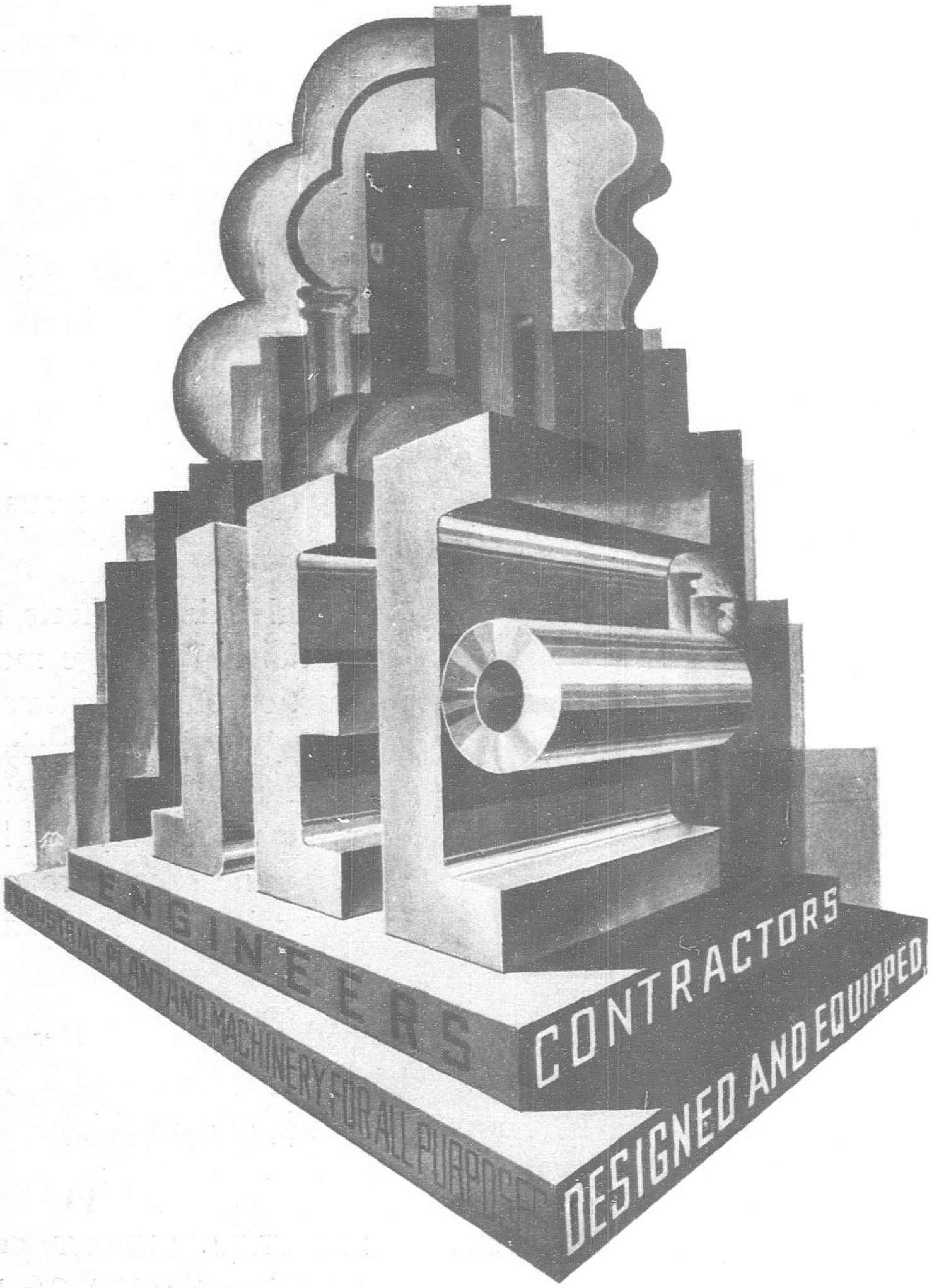
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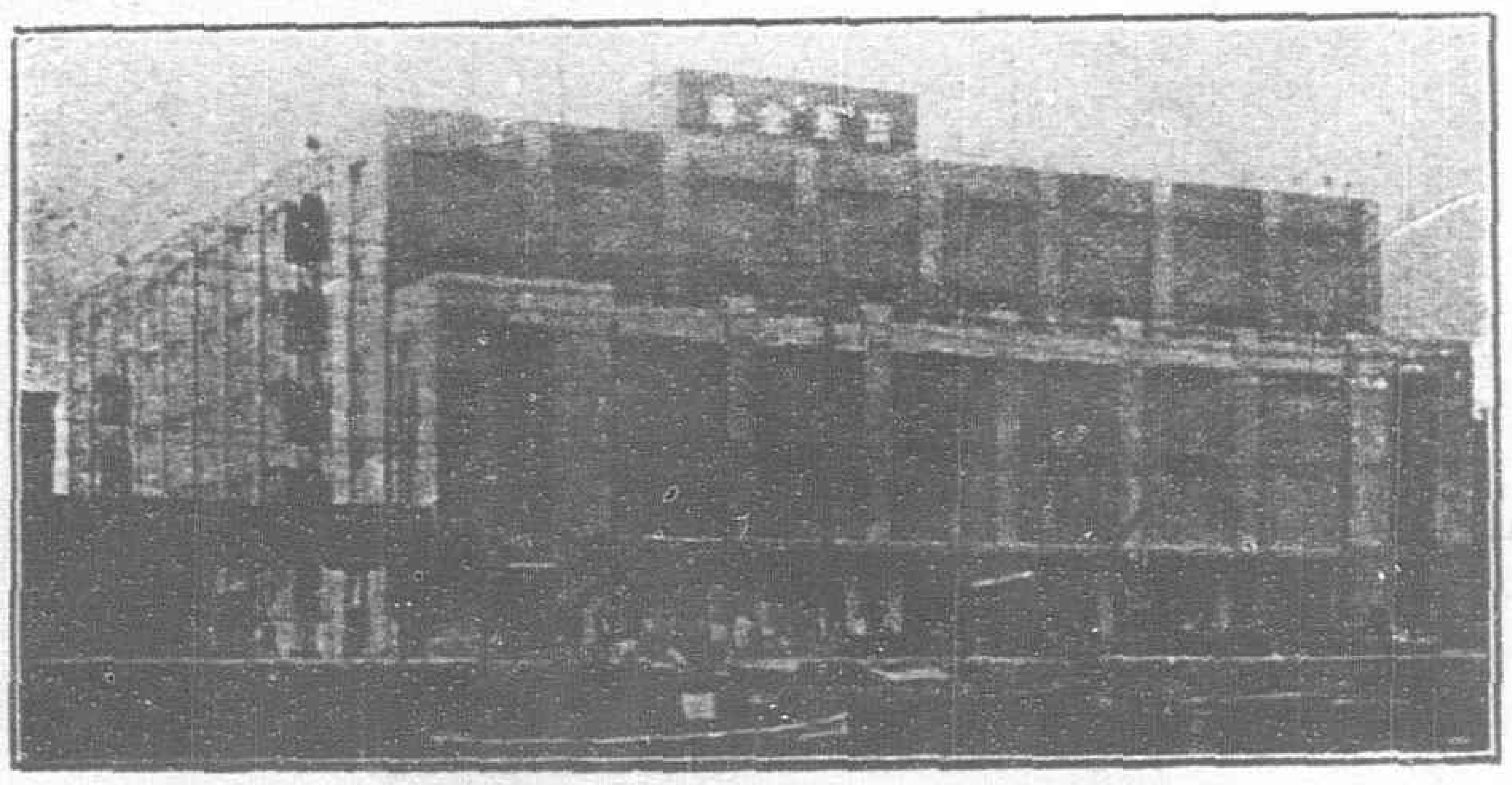

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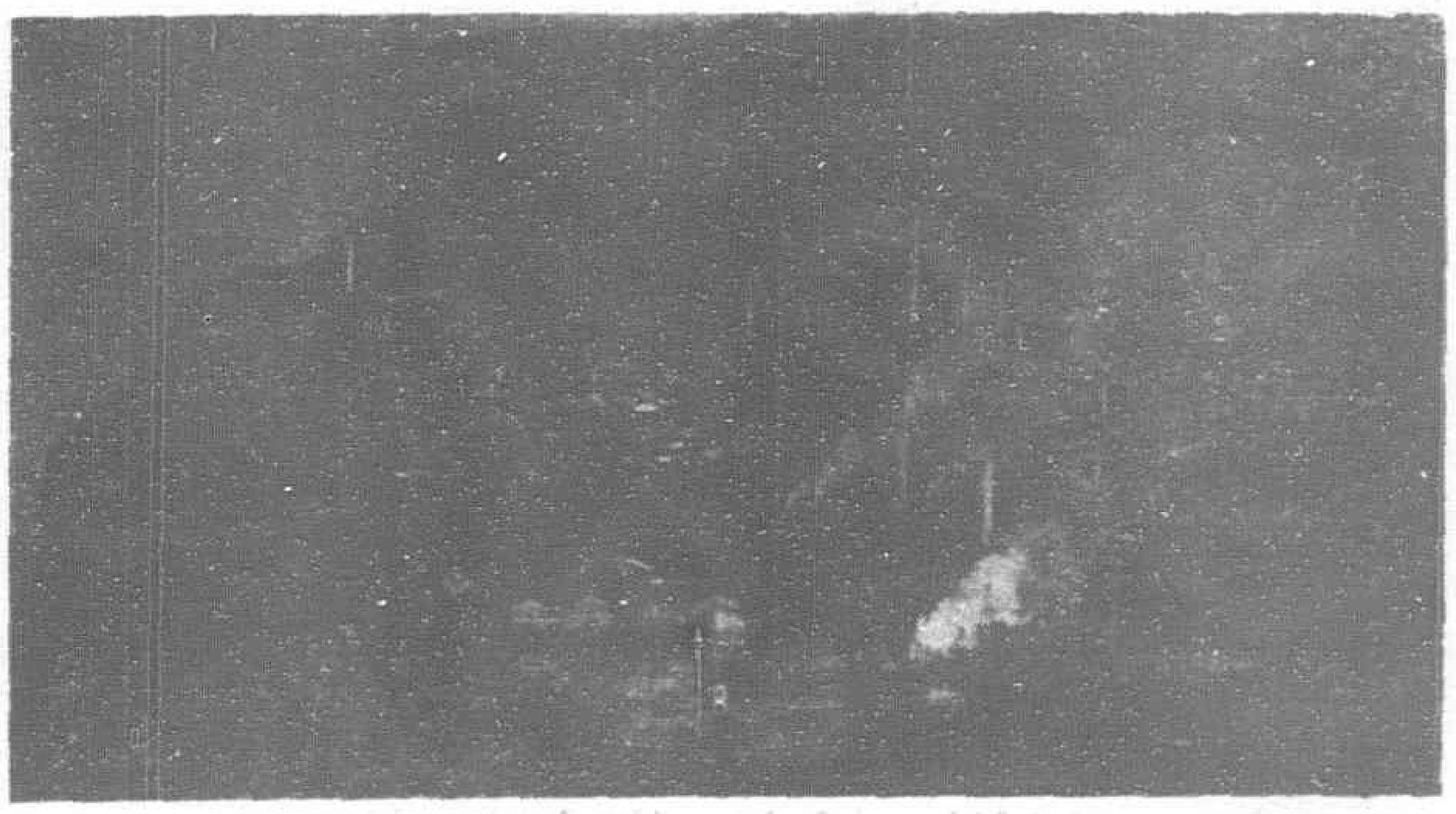

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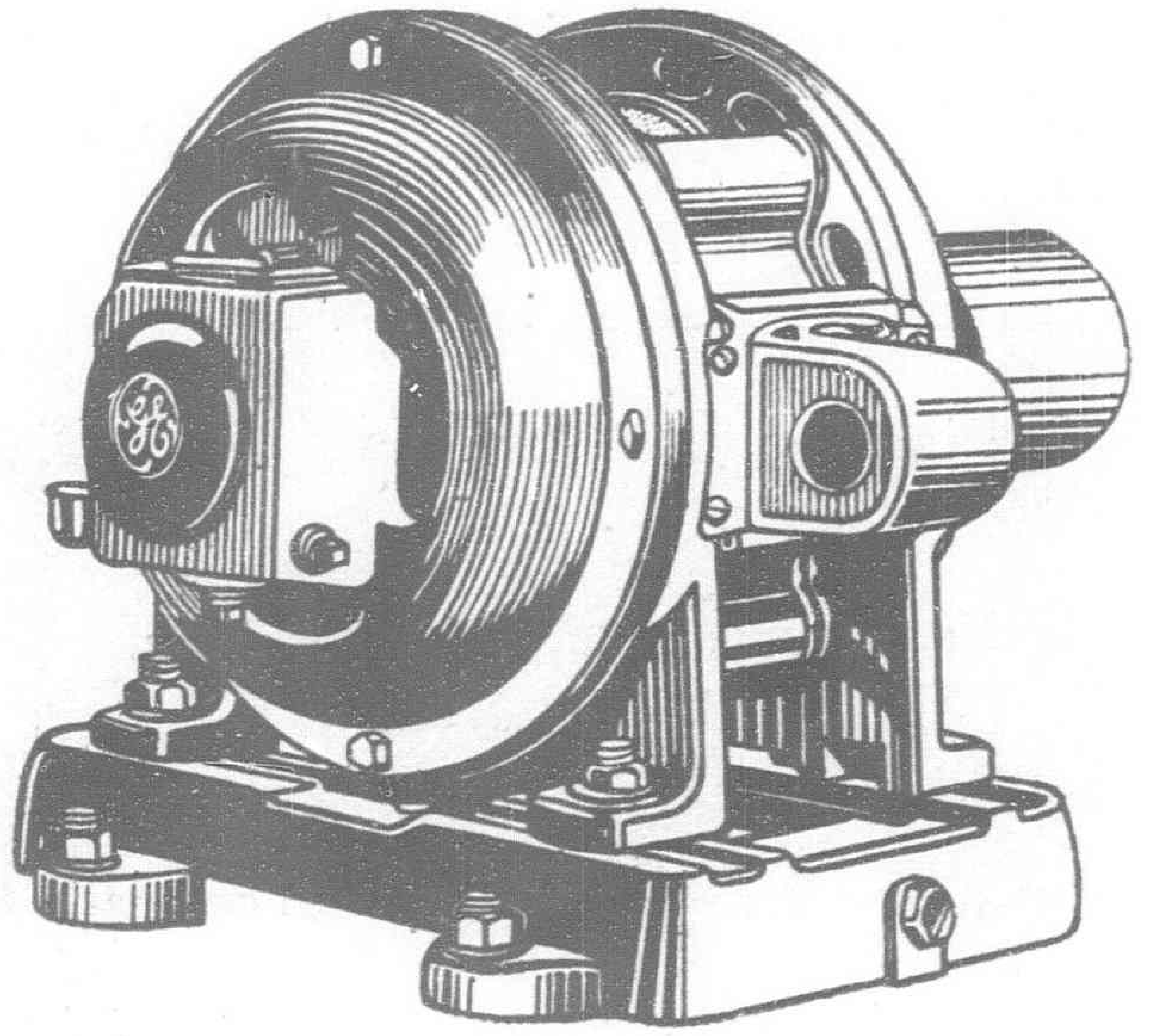

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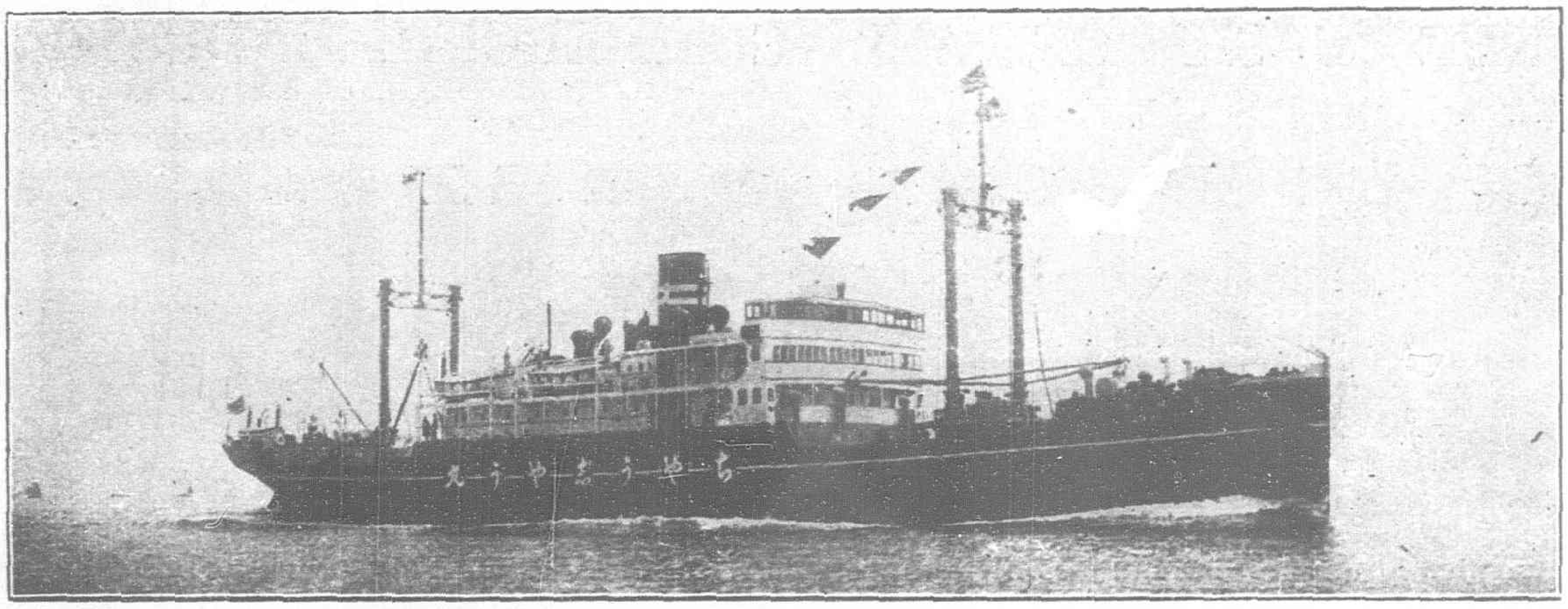

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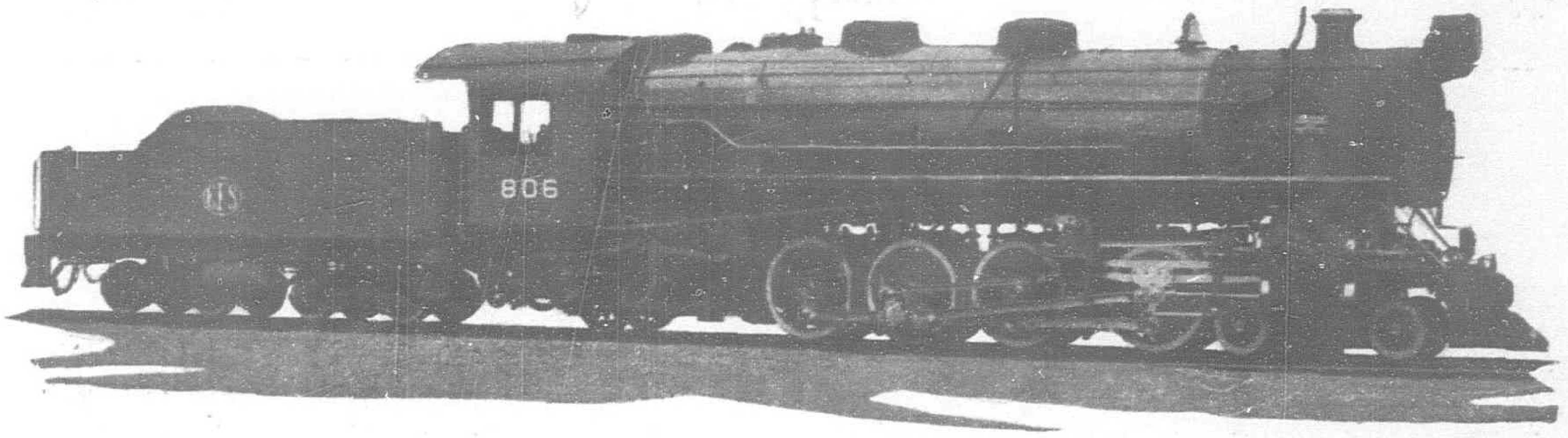

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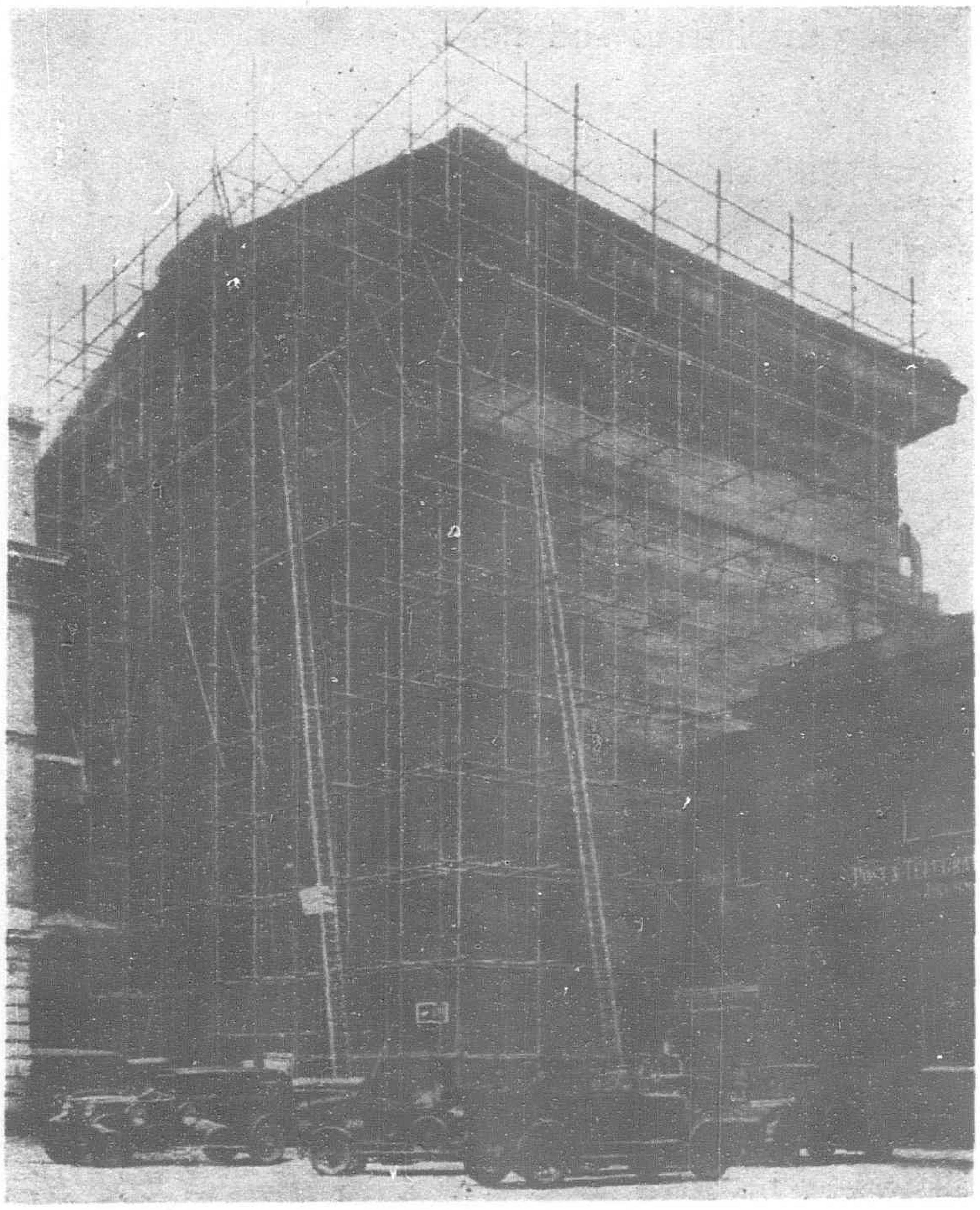

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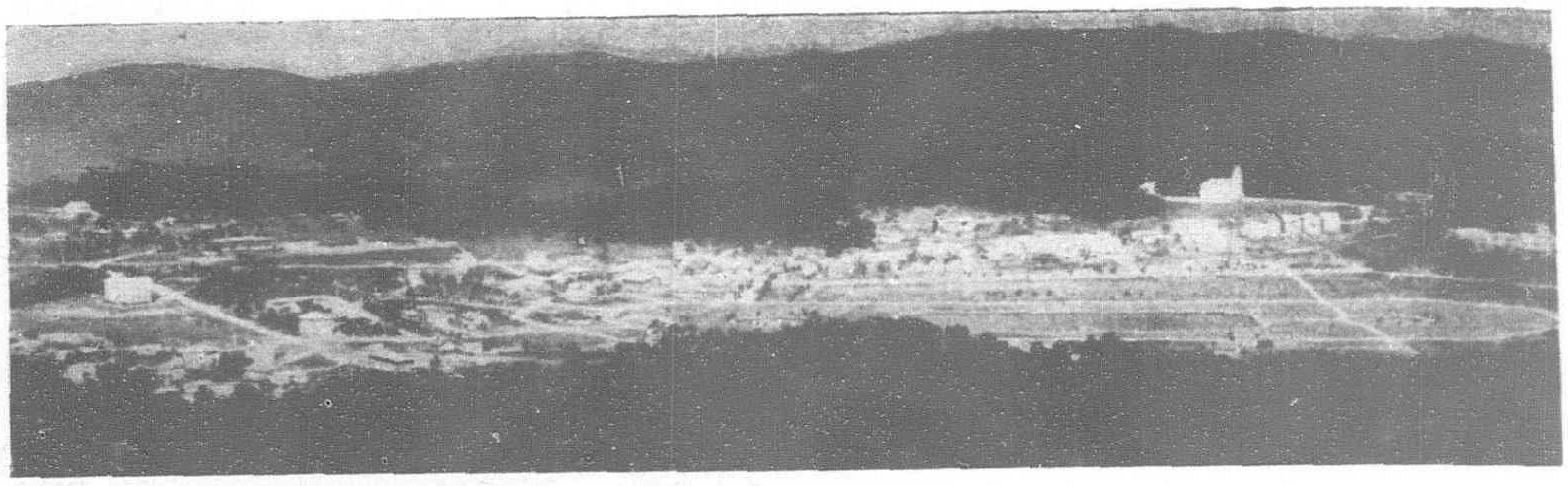

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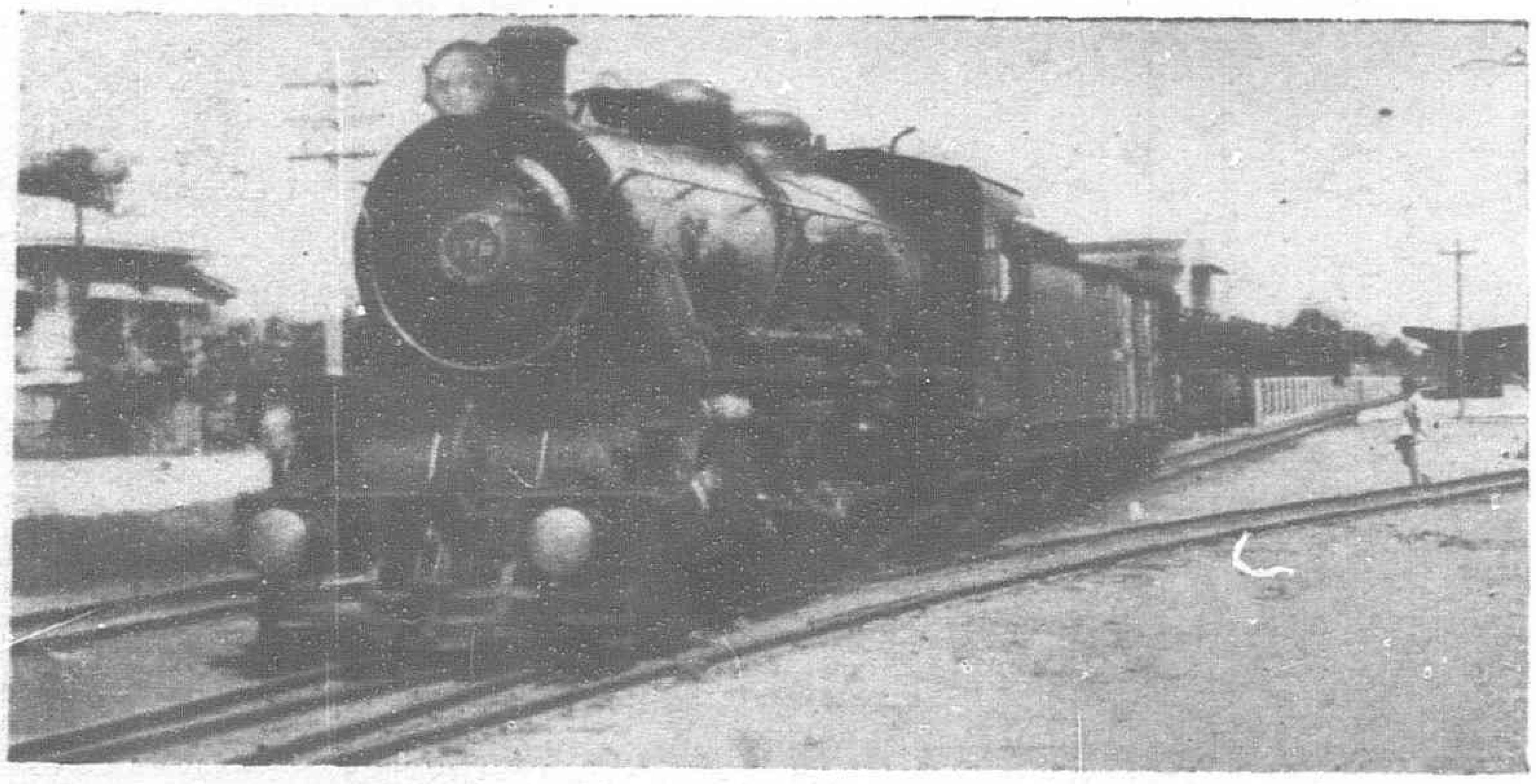

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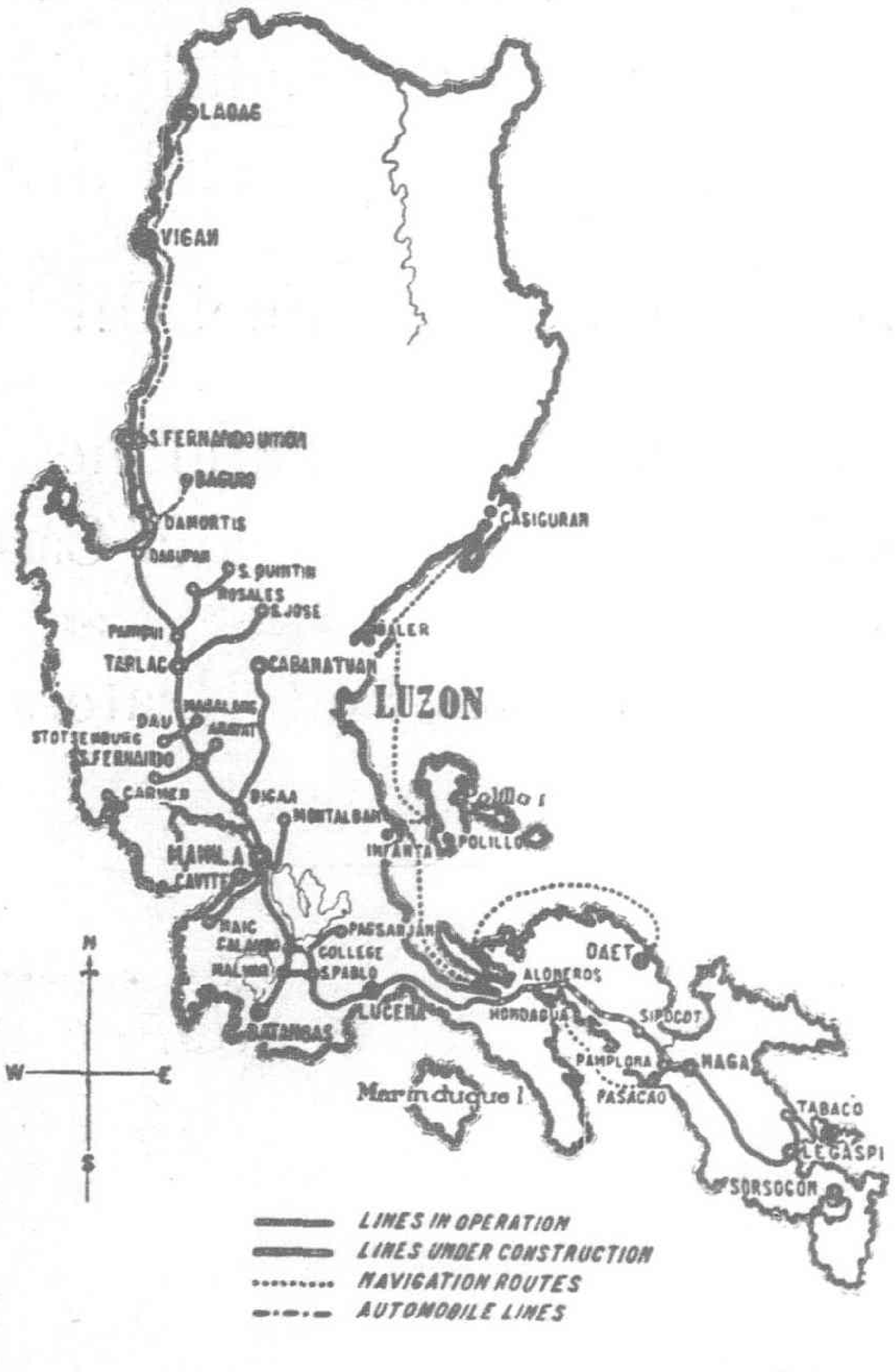

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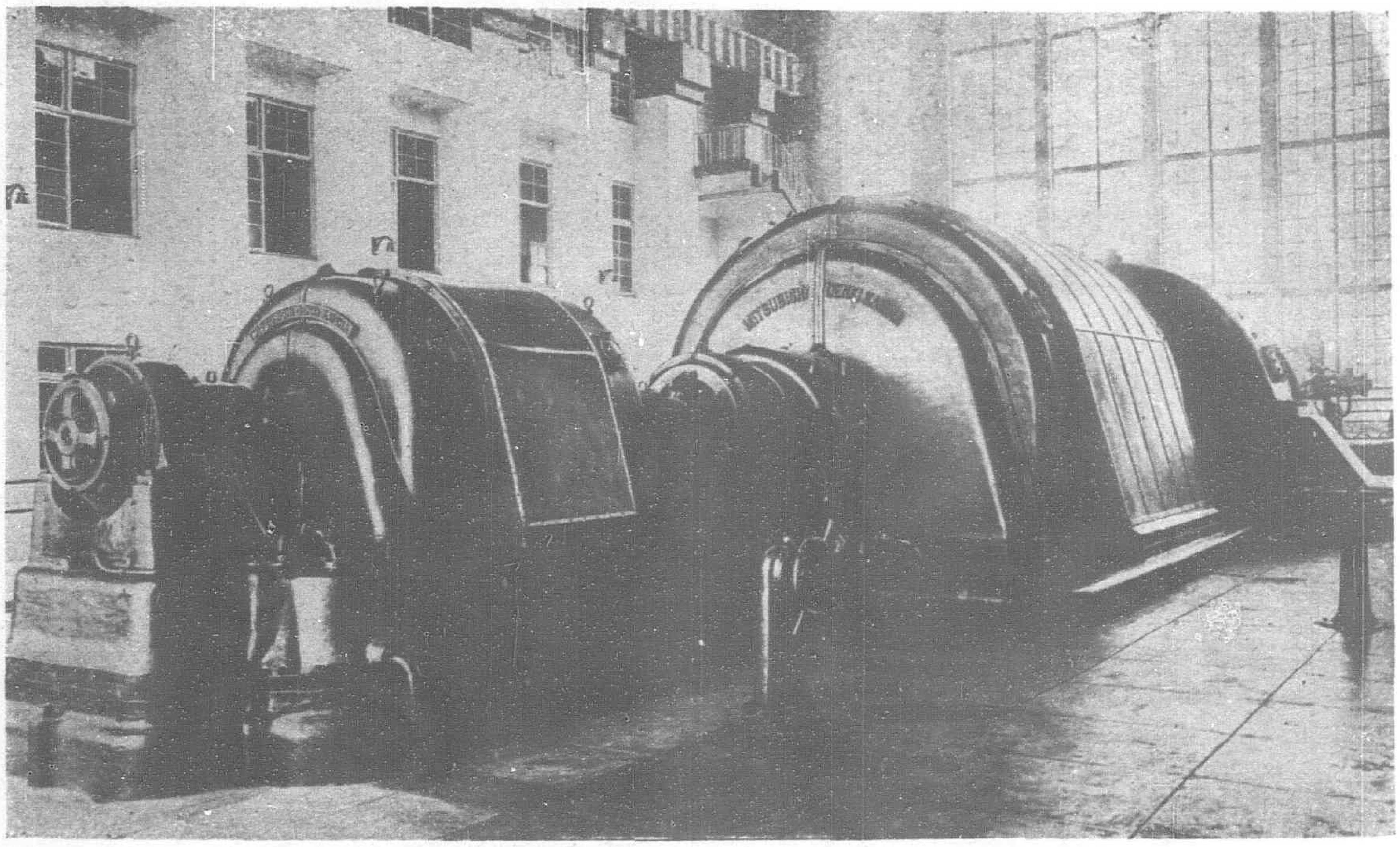

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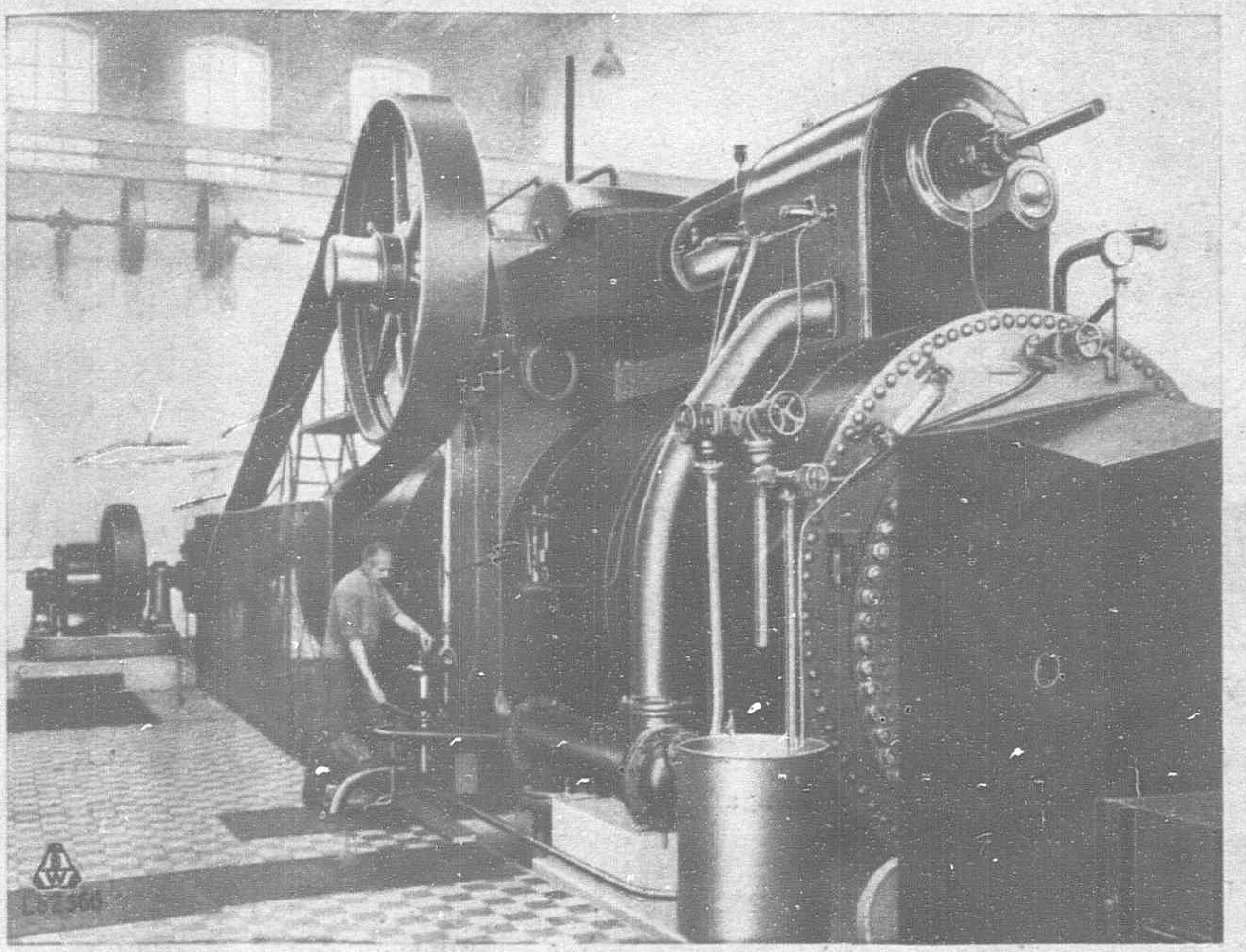

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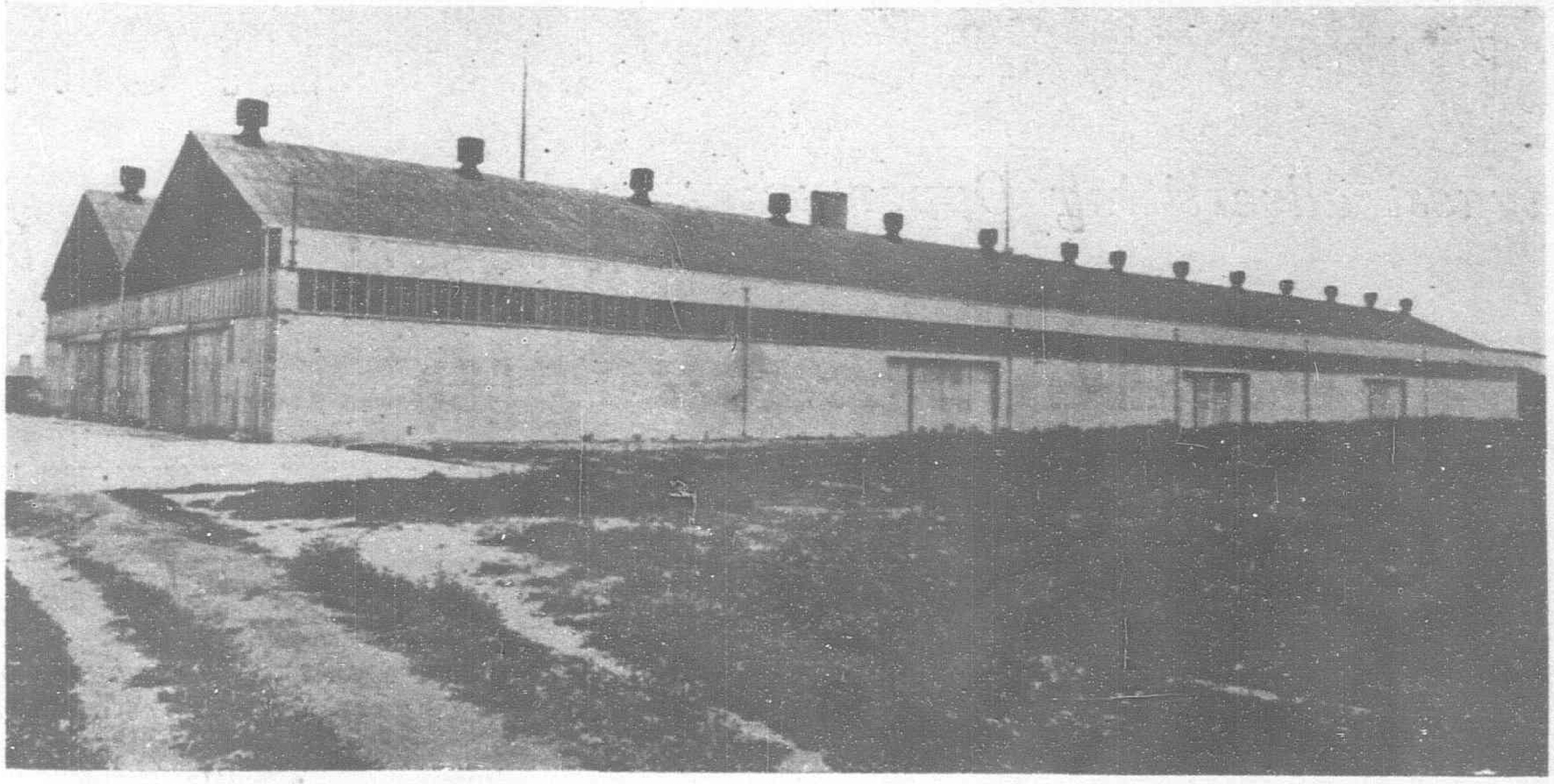

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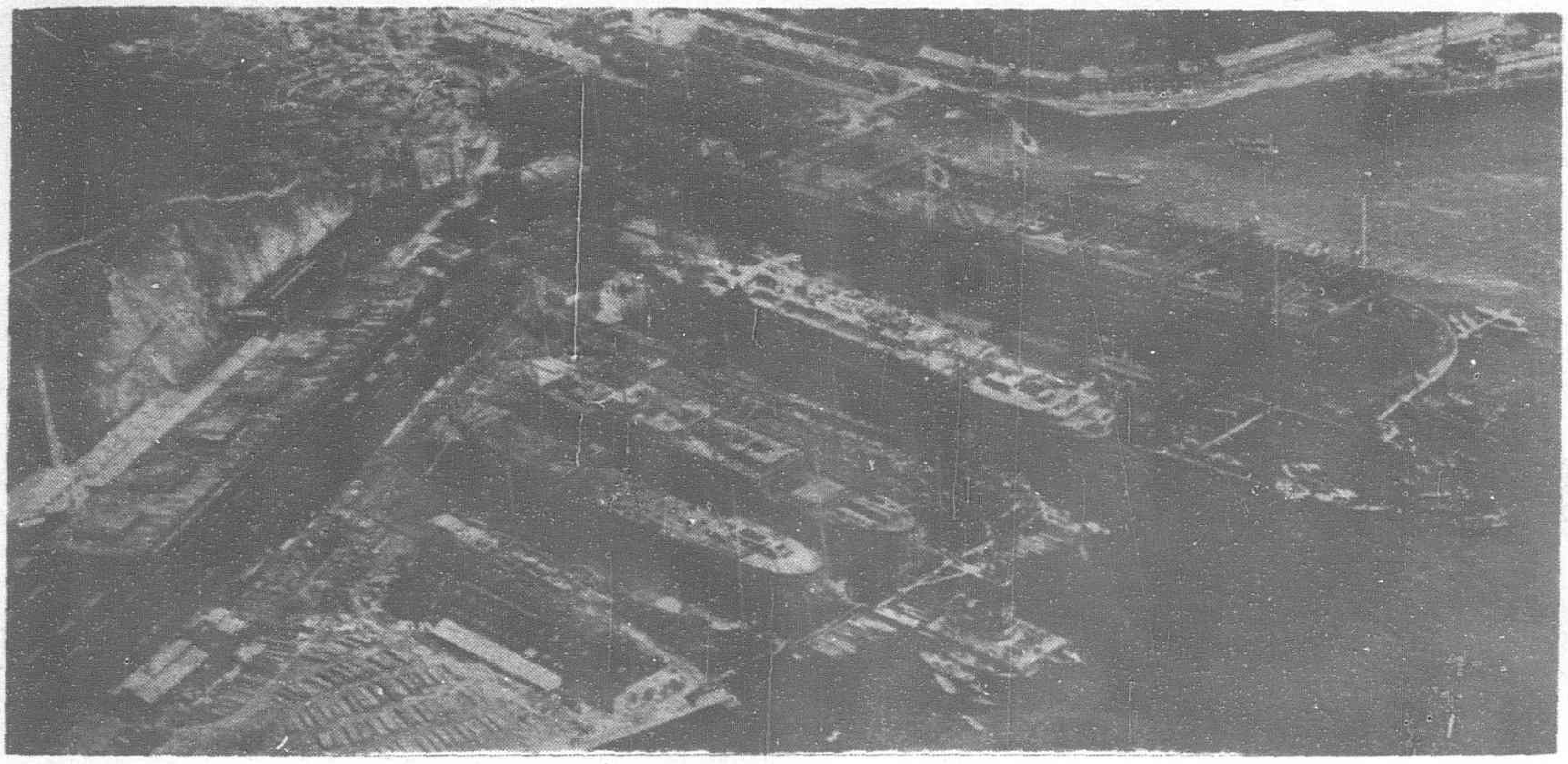

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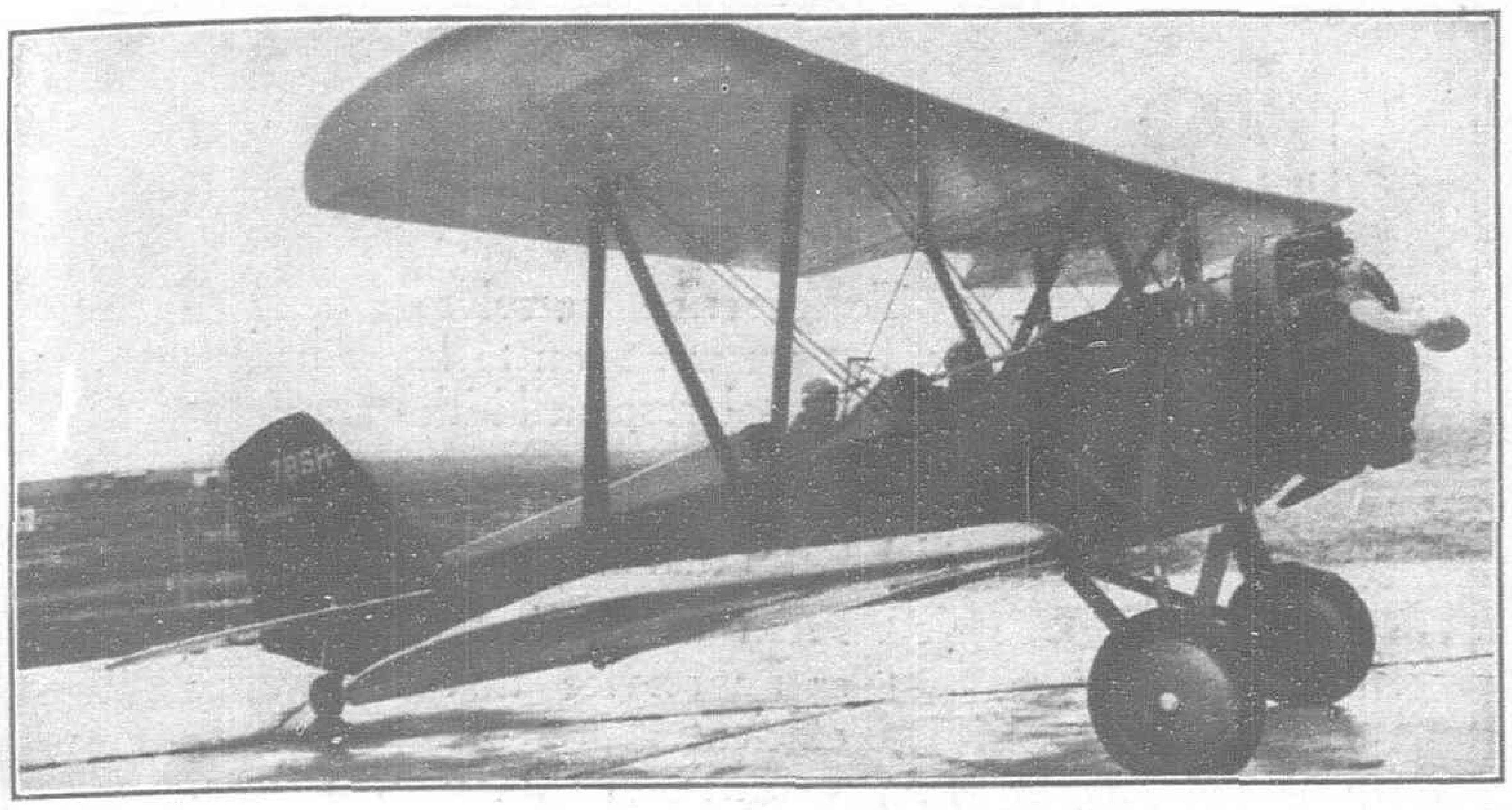

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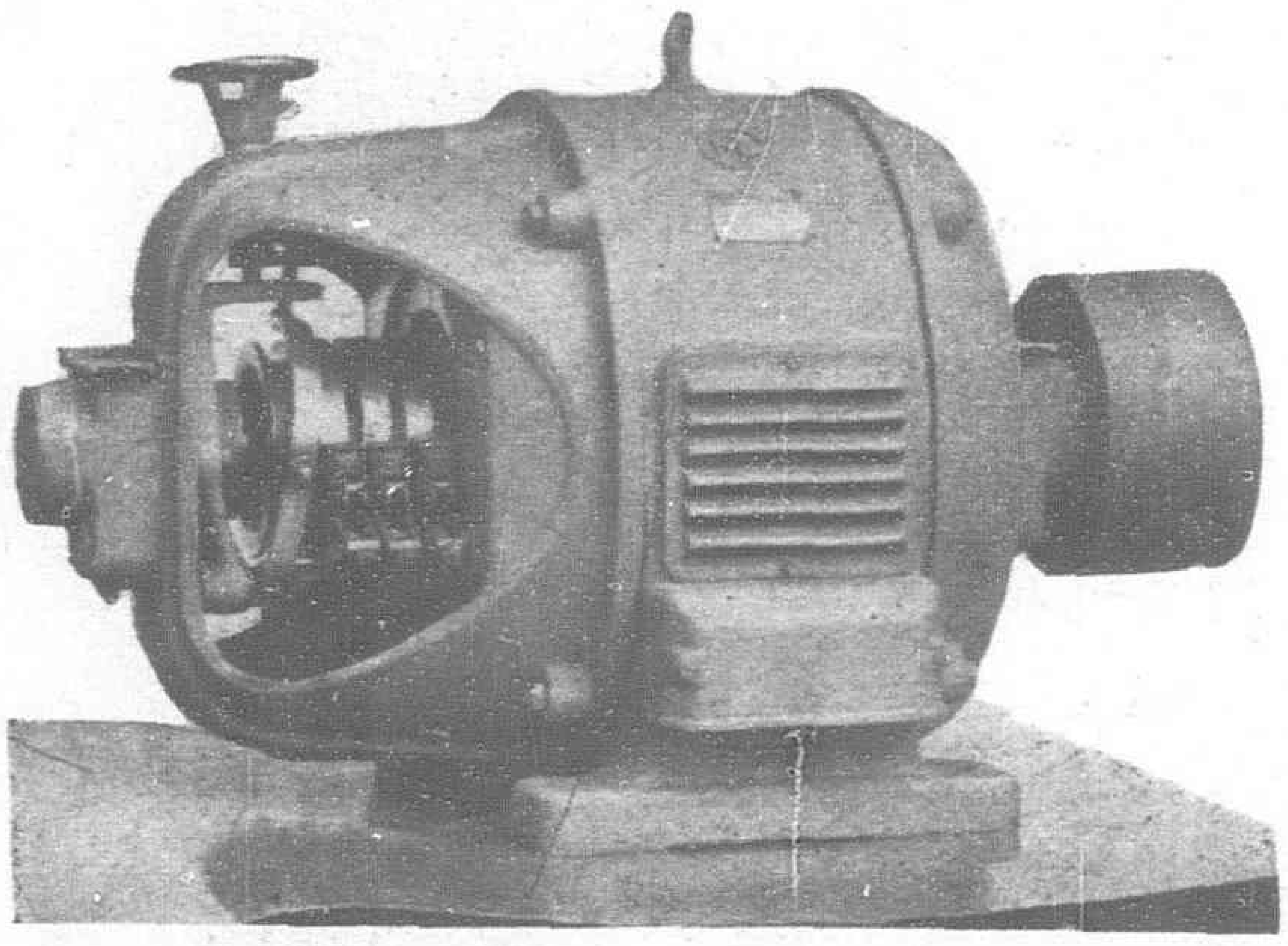

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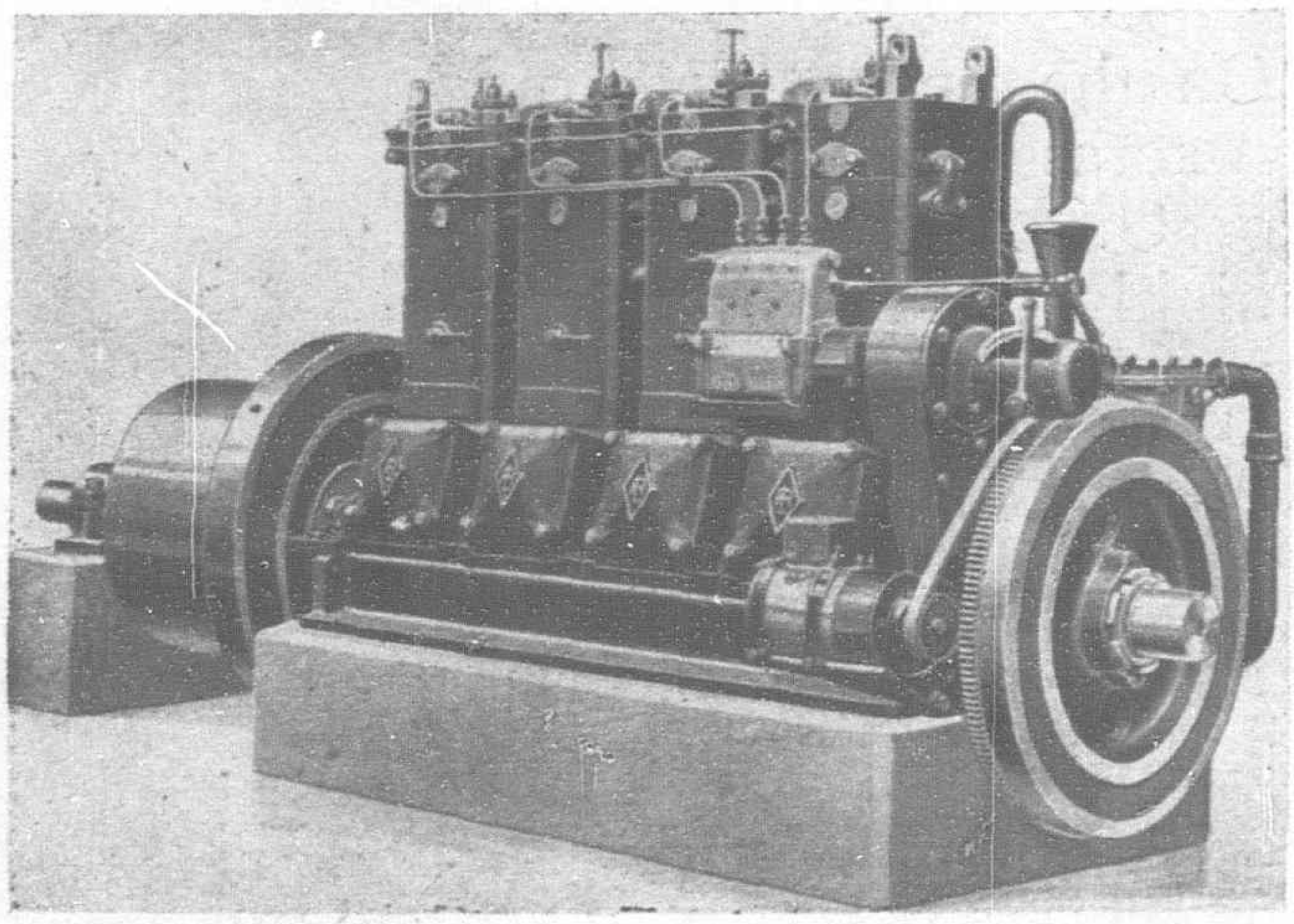

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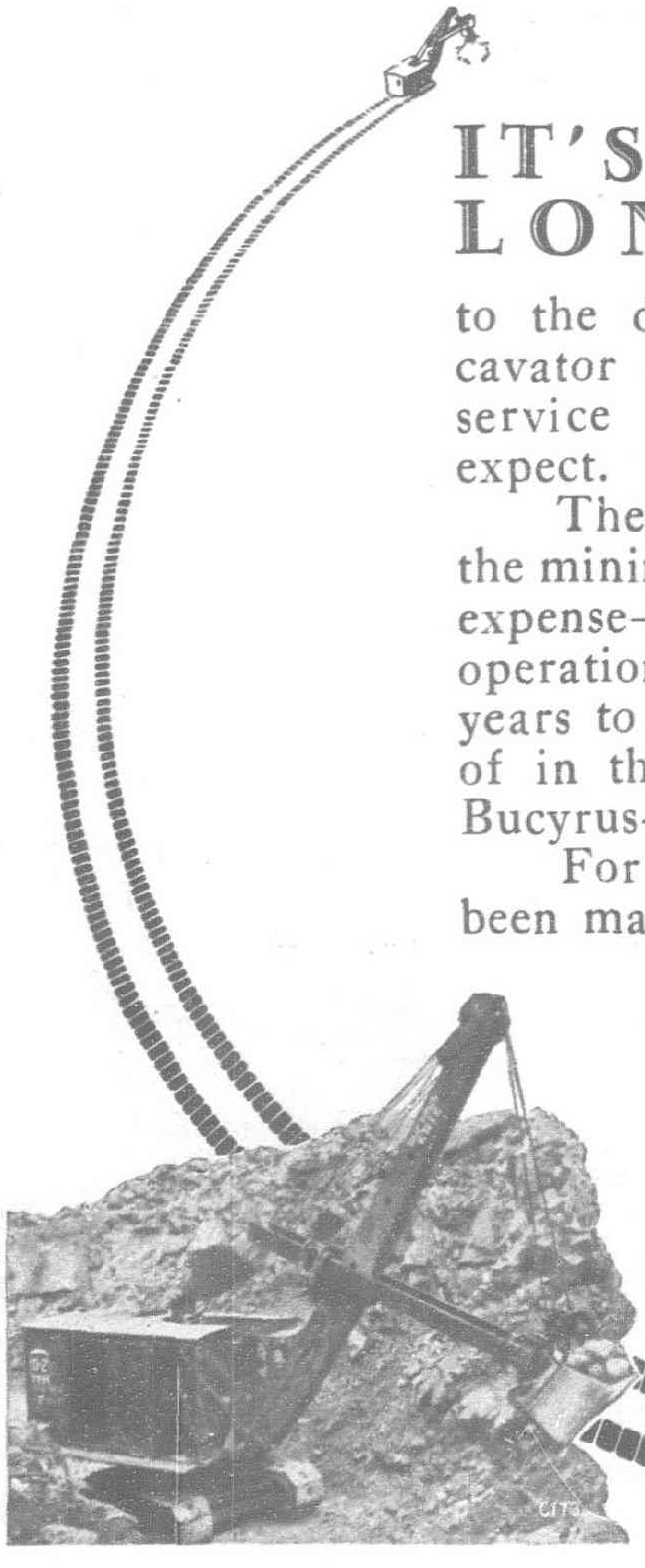

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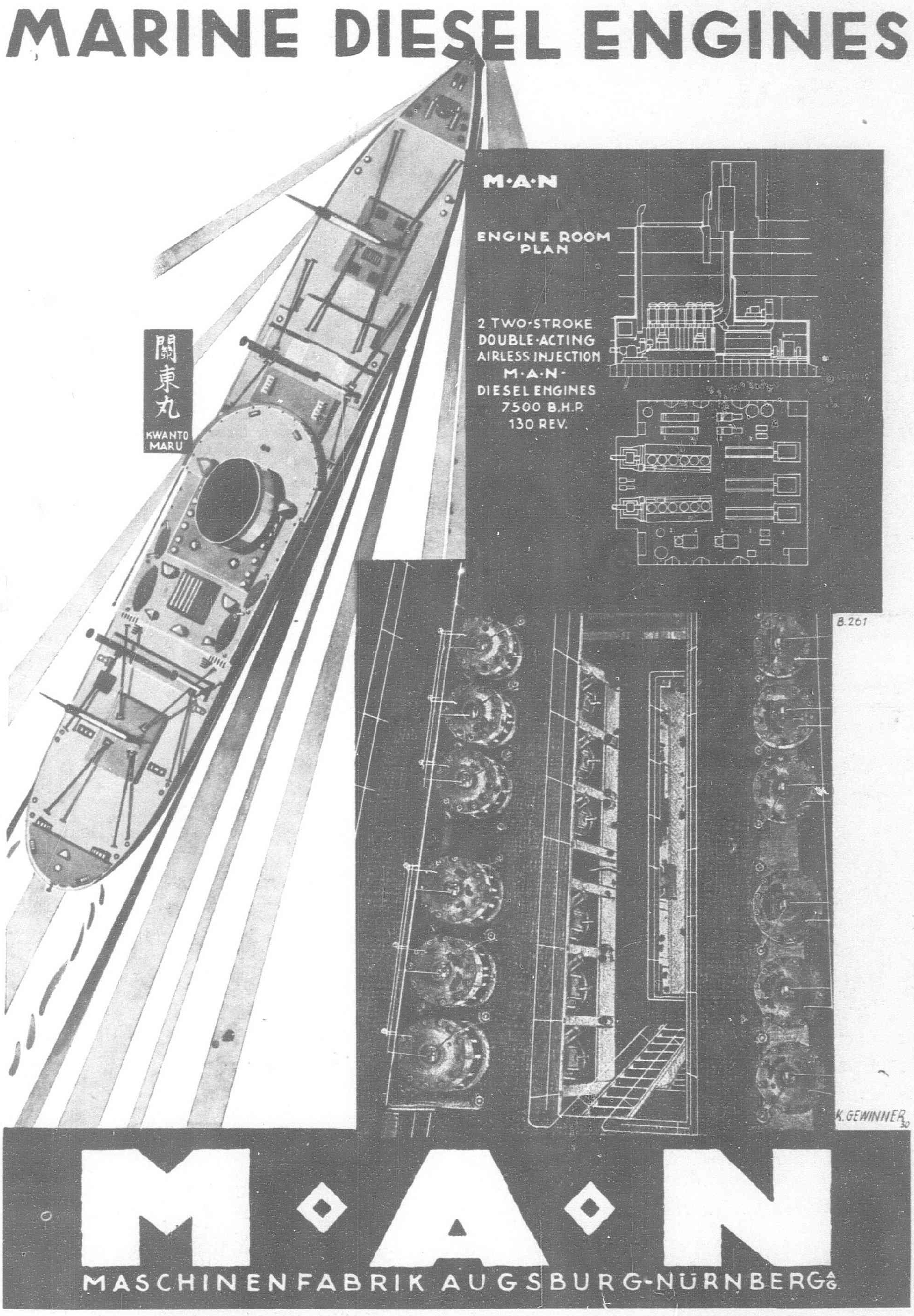
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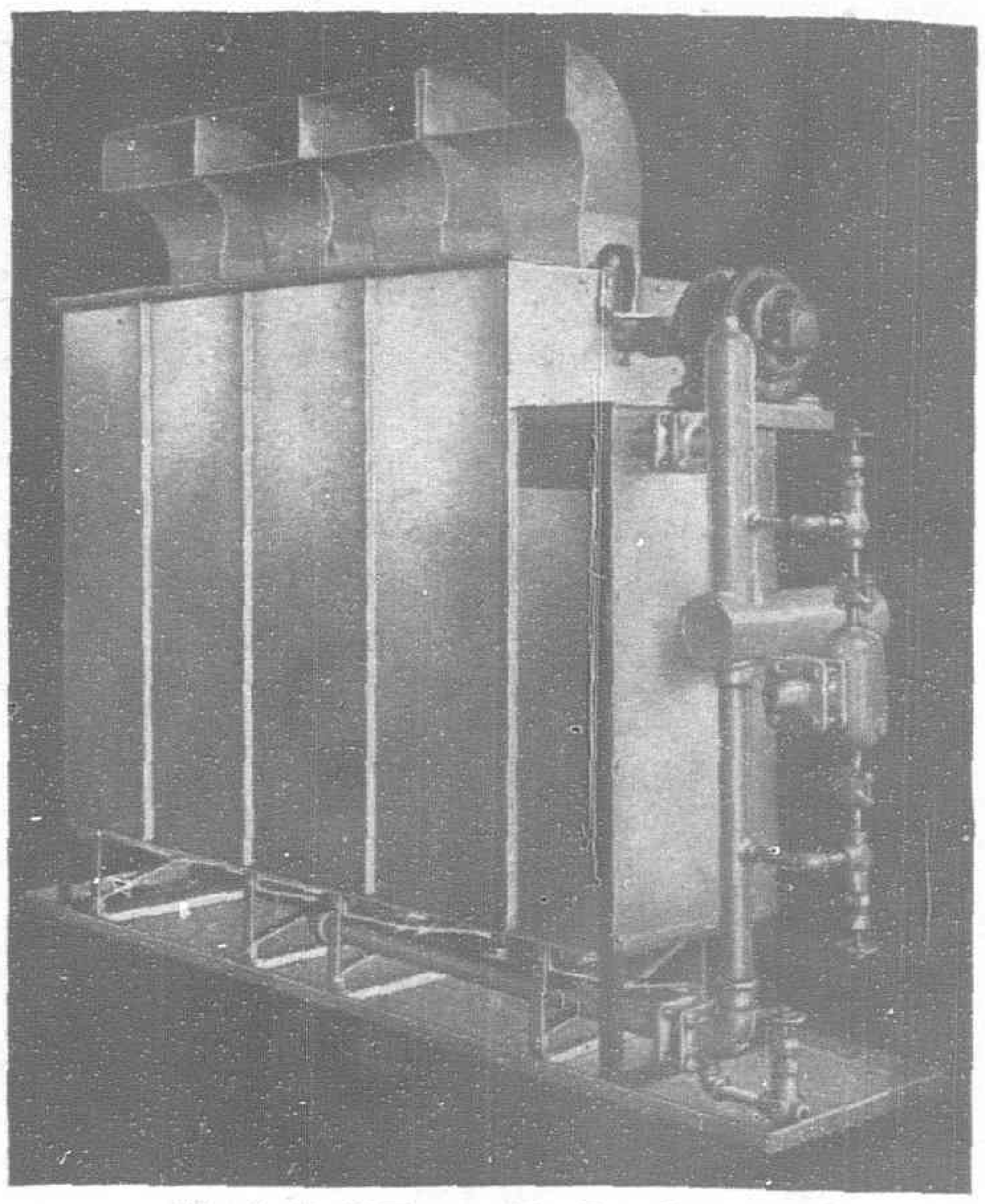

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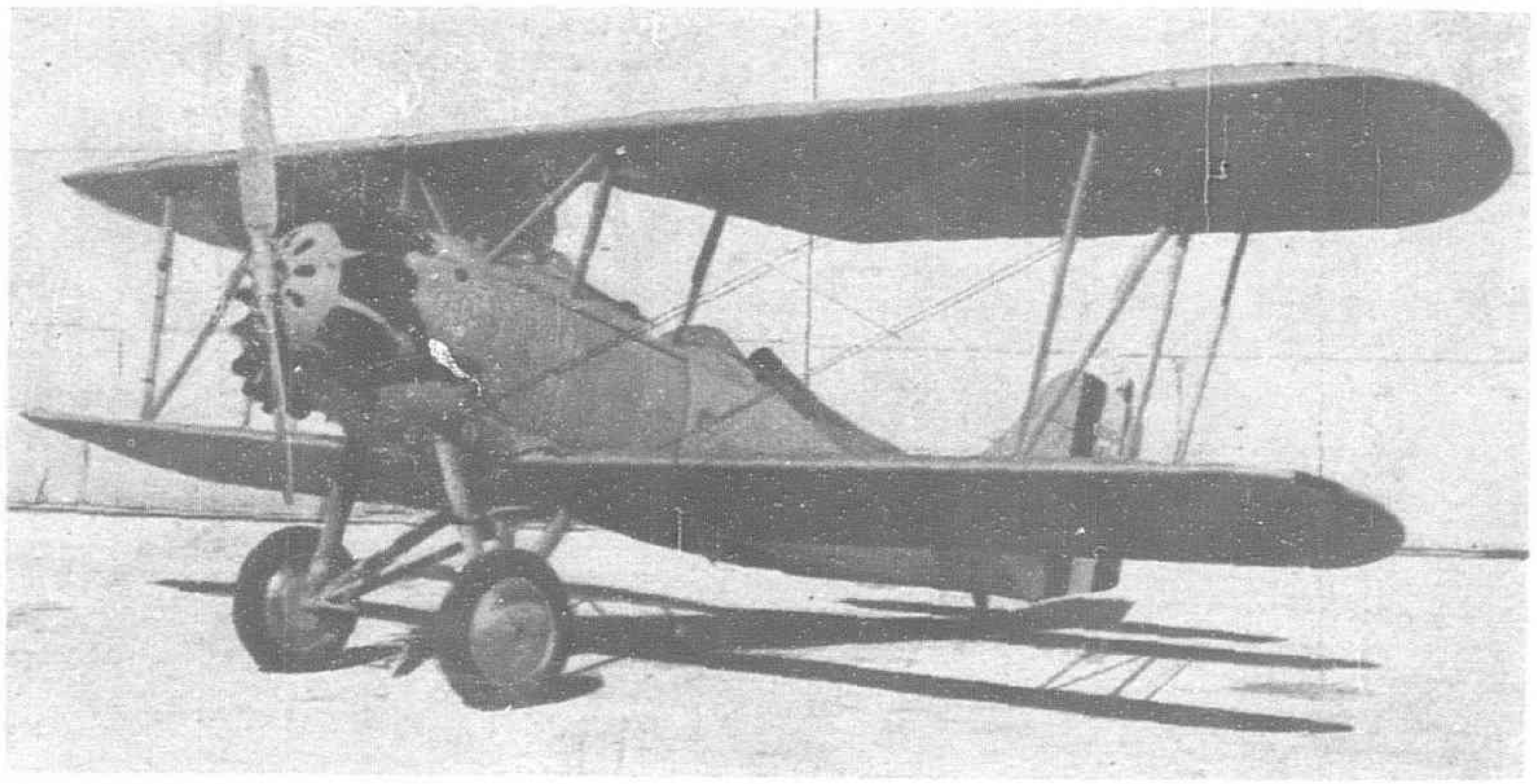

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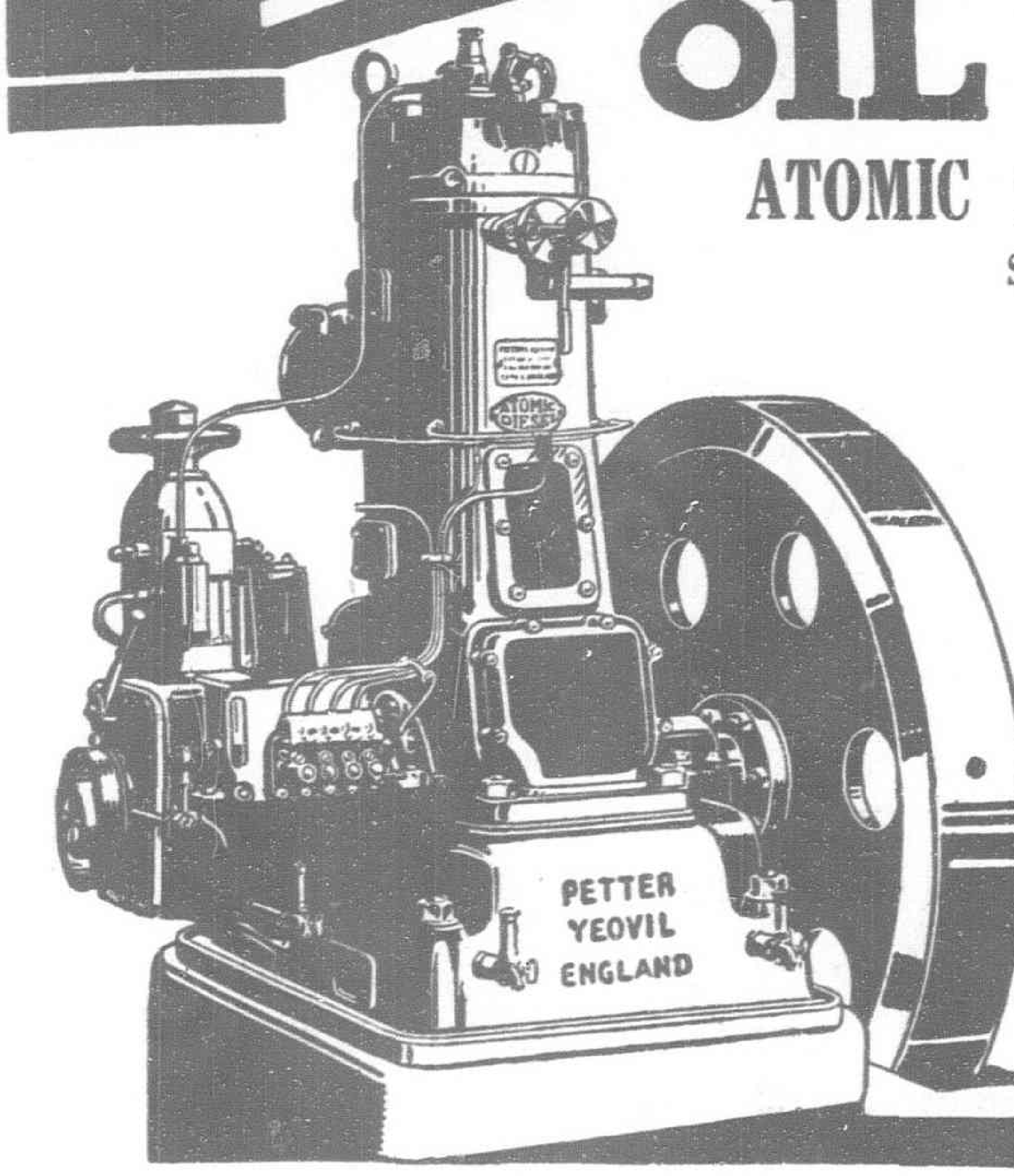

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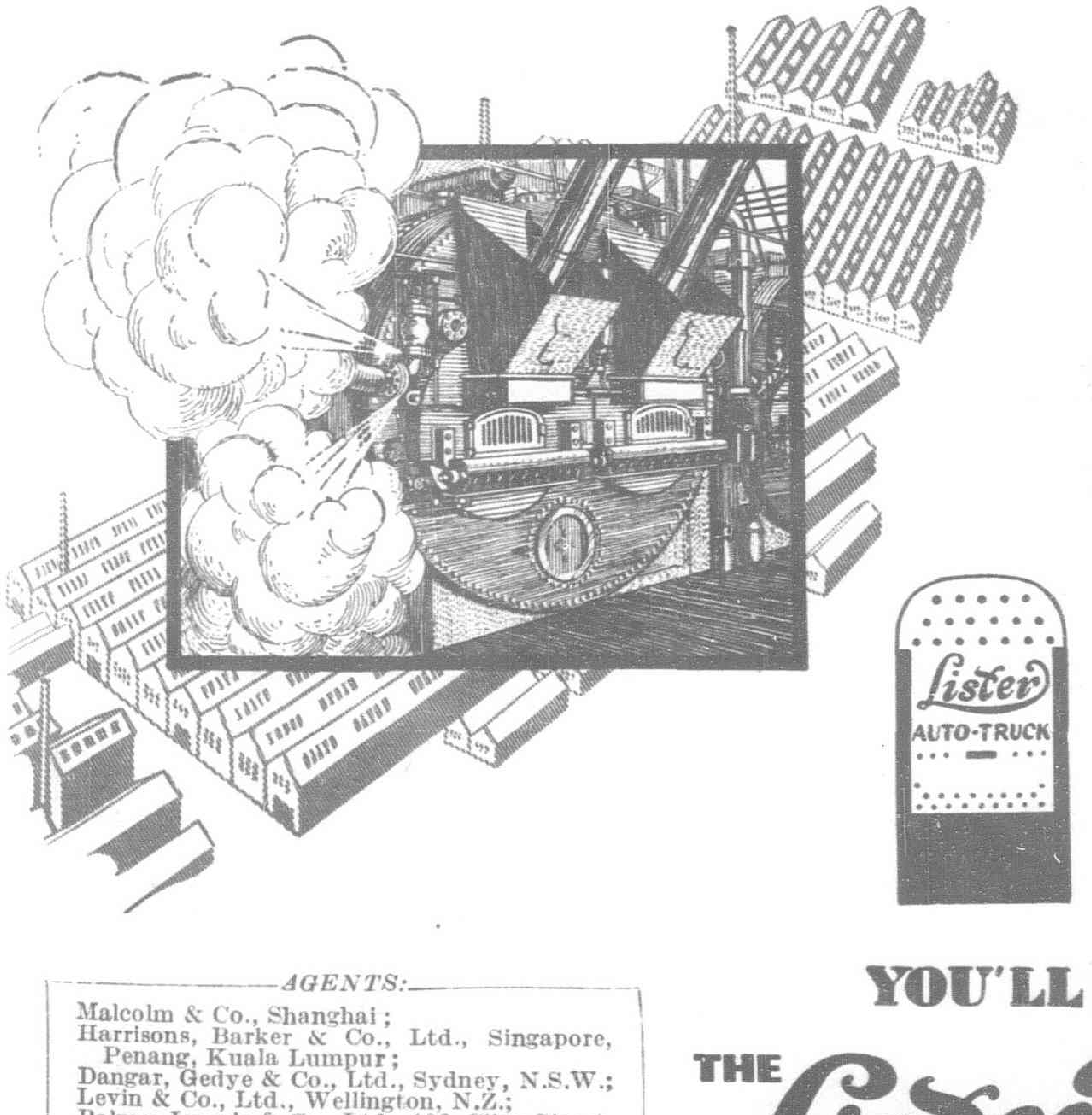

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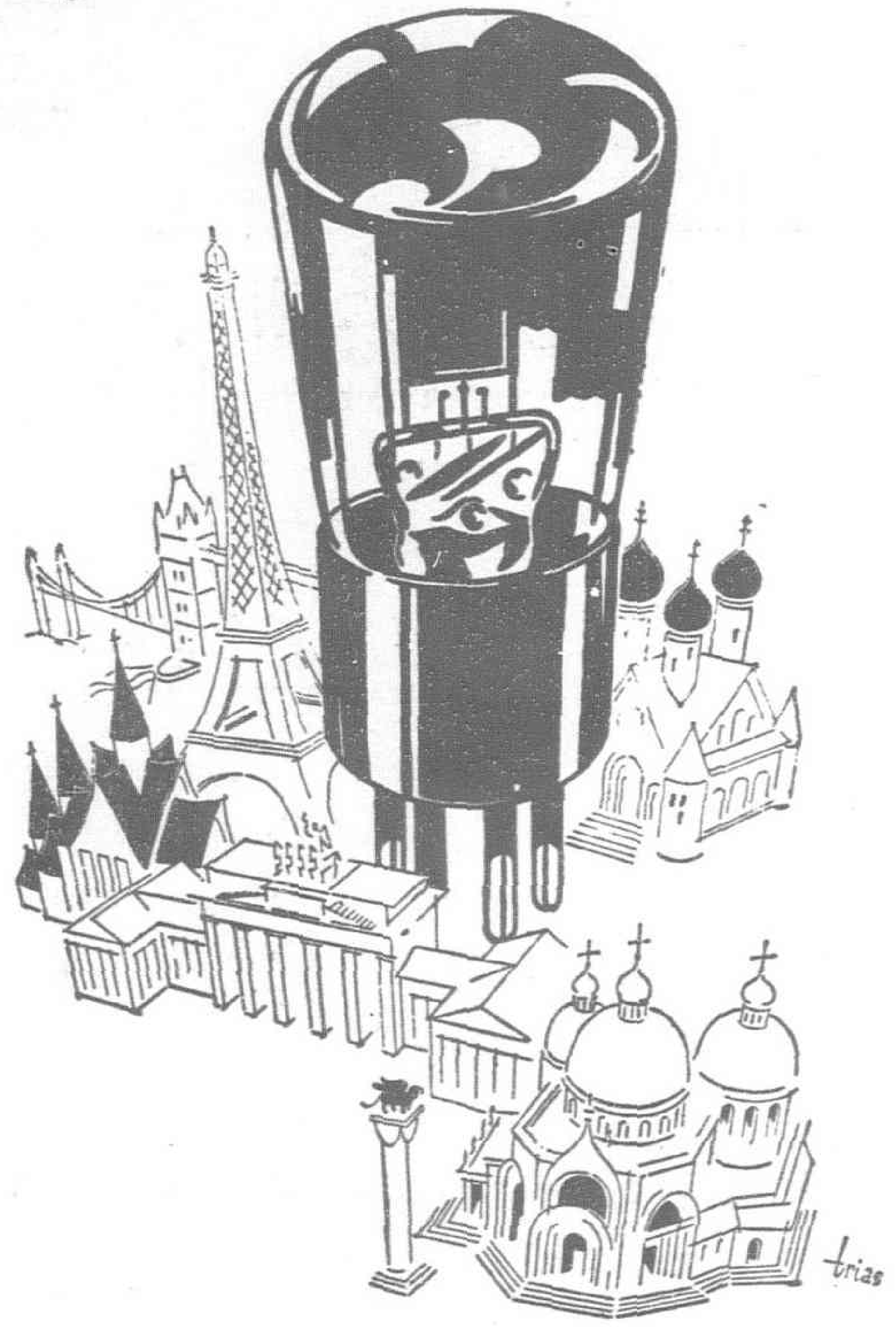

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A Bank, more perhaps than any other business concern, owes its success to an unshaken reputation; and the reputation enjoyed by the American-Oriental Banking Corporation has been built up only through steady years of progress. Our record of stability happily finds us firmly established in the World of Commerce, with resources exceeding 10¼ million dollars, of which some two millions are cash in hand.

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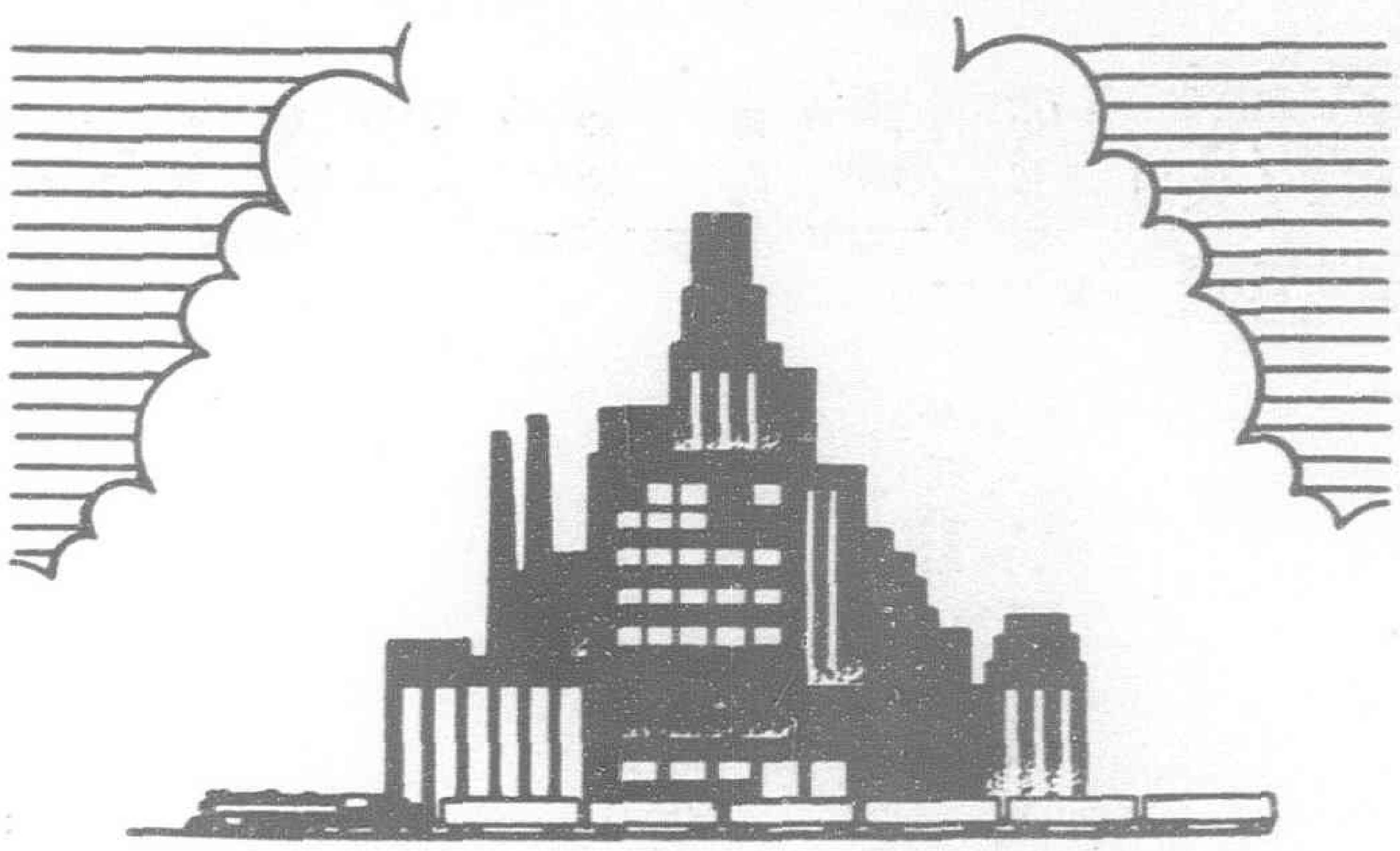

OUR GROWING PORT

SPICES and silks from the East, implements and machinery from the West, vie with each other in the bustling trade of the port. Anon, they lie in orderly array in the vast buildings (Godowns) which, carefully-designed and constructed, line the wharves.

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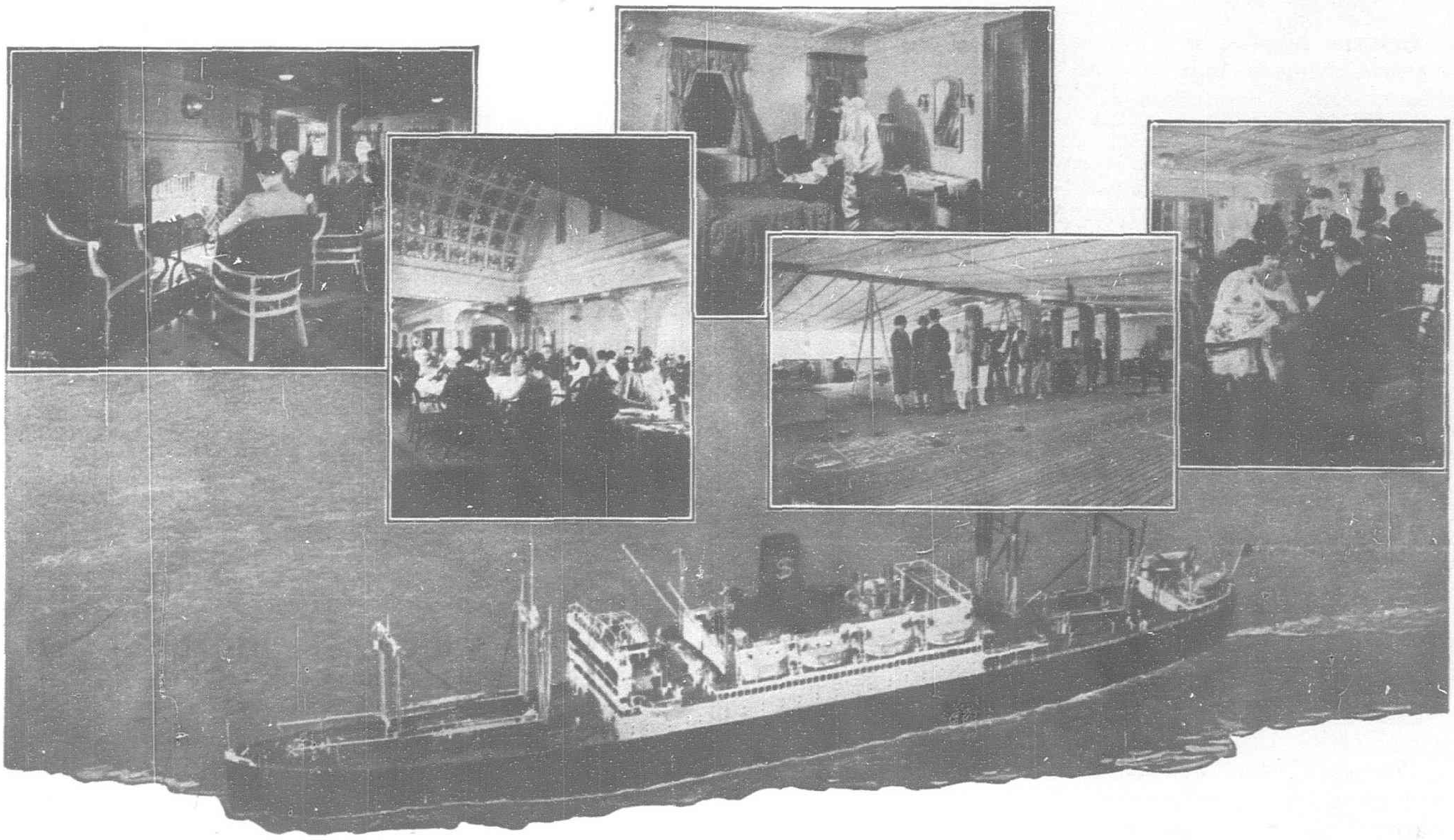

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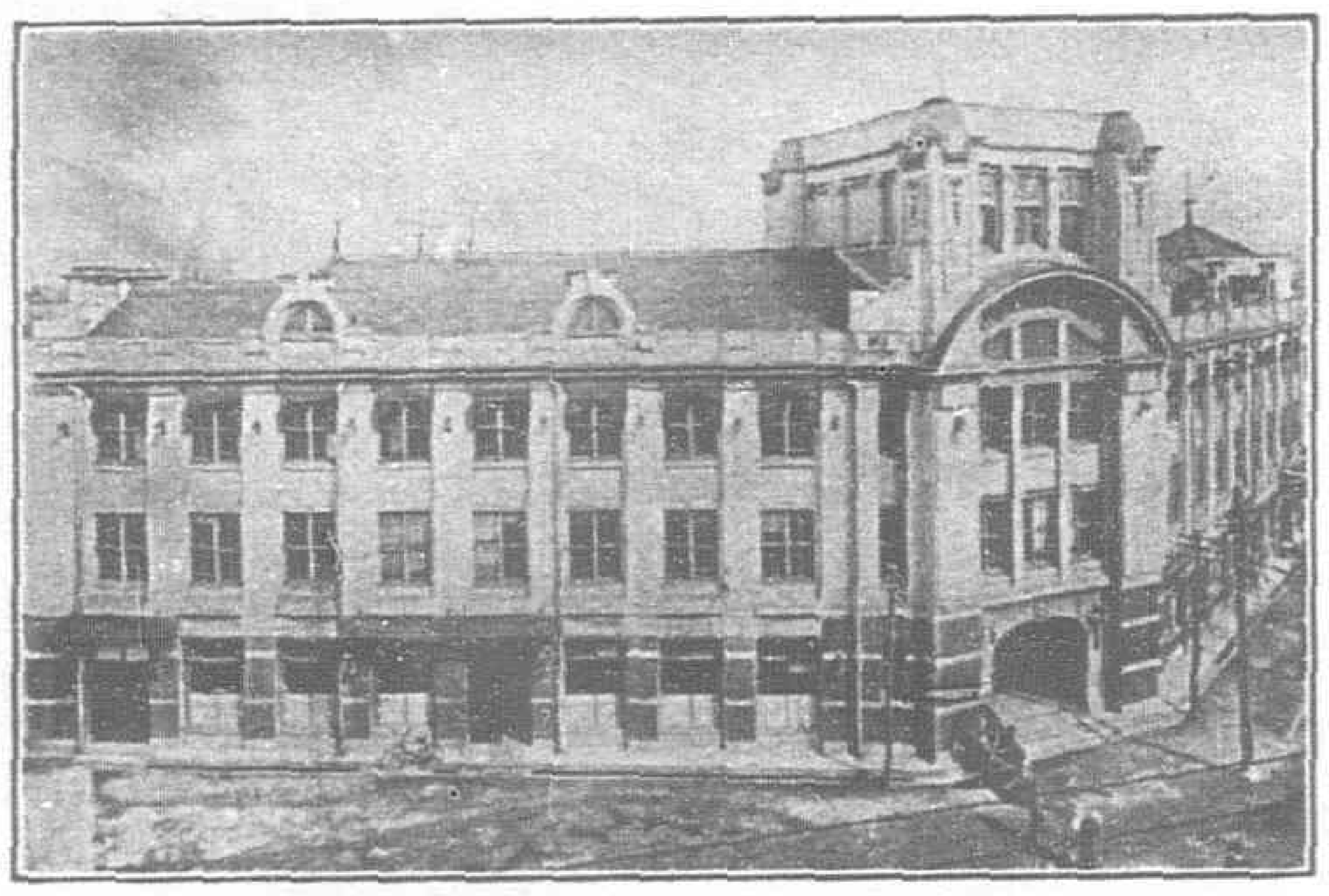

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Ujigawa Electric Power Co., Ltd.

Osaka, Japan.

Authorized Capital Yen 85,000,000.00

YASUSHIGE HAYASHI, *President and Director*
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9 Power houses (permit obtained) with a total capacity of	83,400 K.W.
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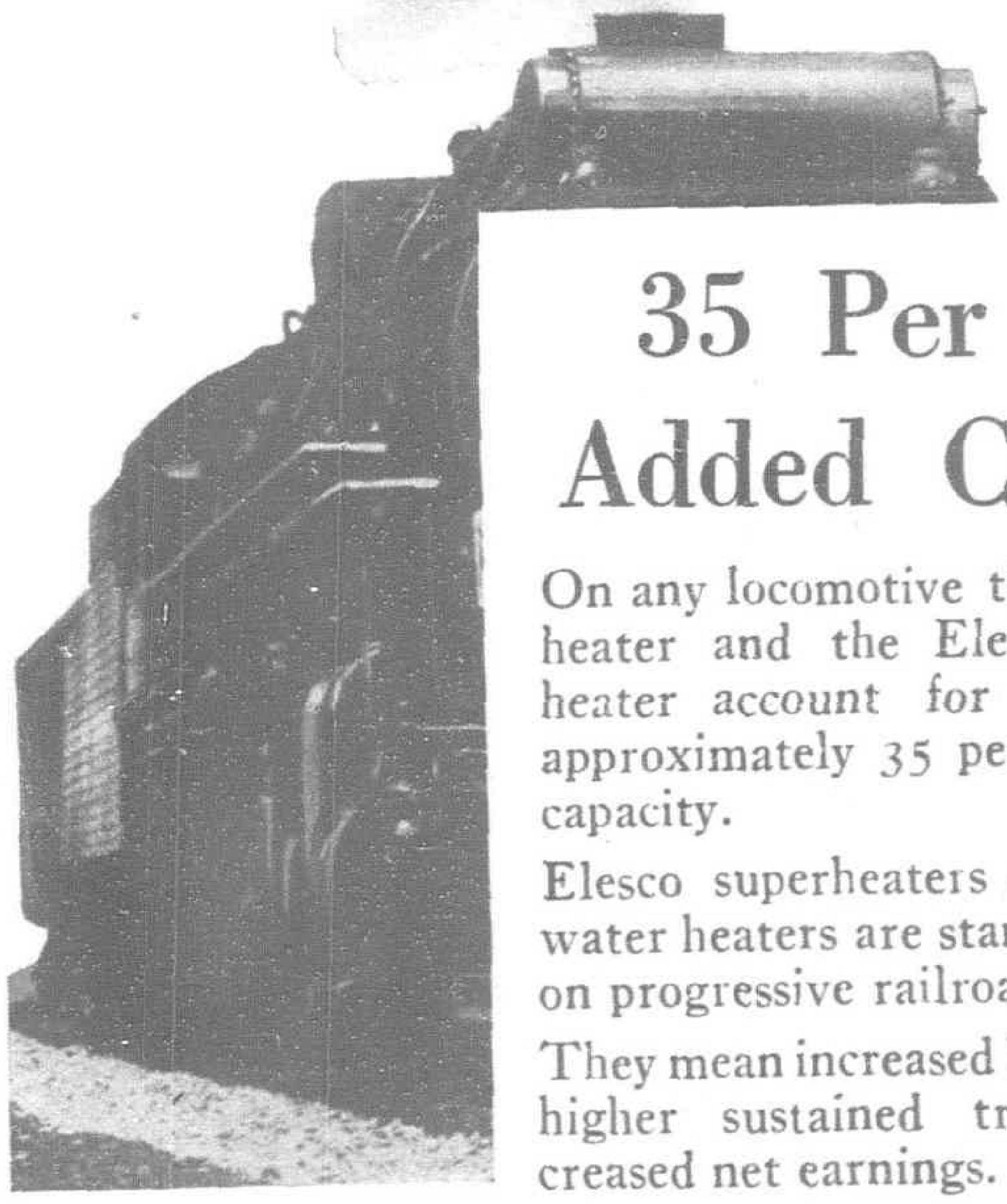
Power supplied	267,021 H.P.
Its Customers	14,568
Electric Lights	319,186
Its Customers	146,040
Purchased Power	100,100 K.W.



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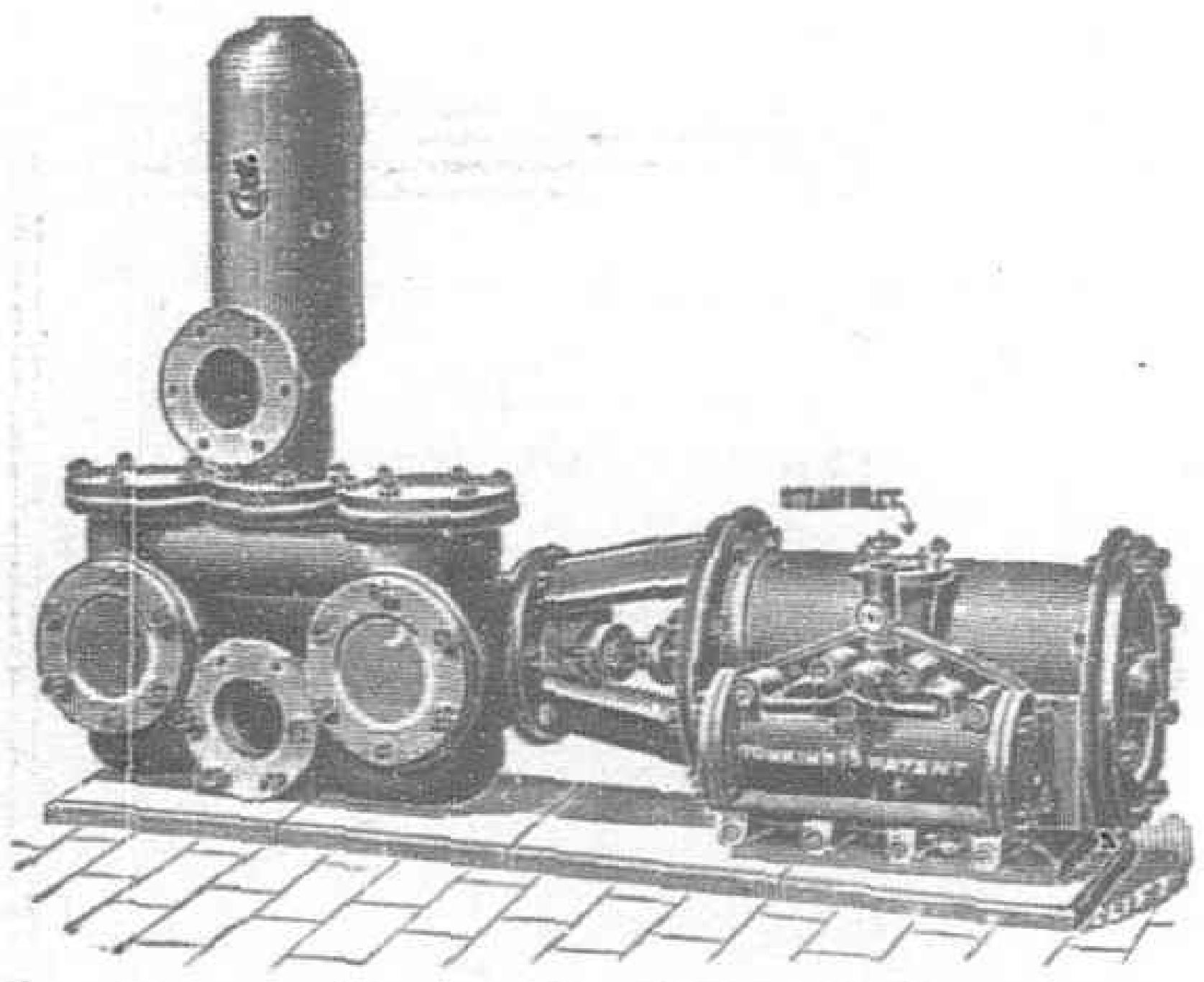
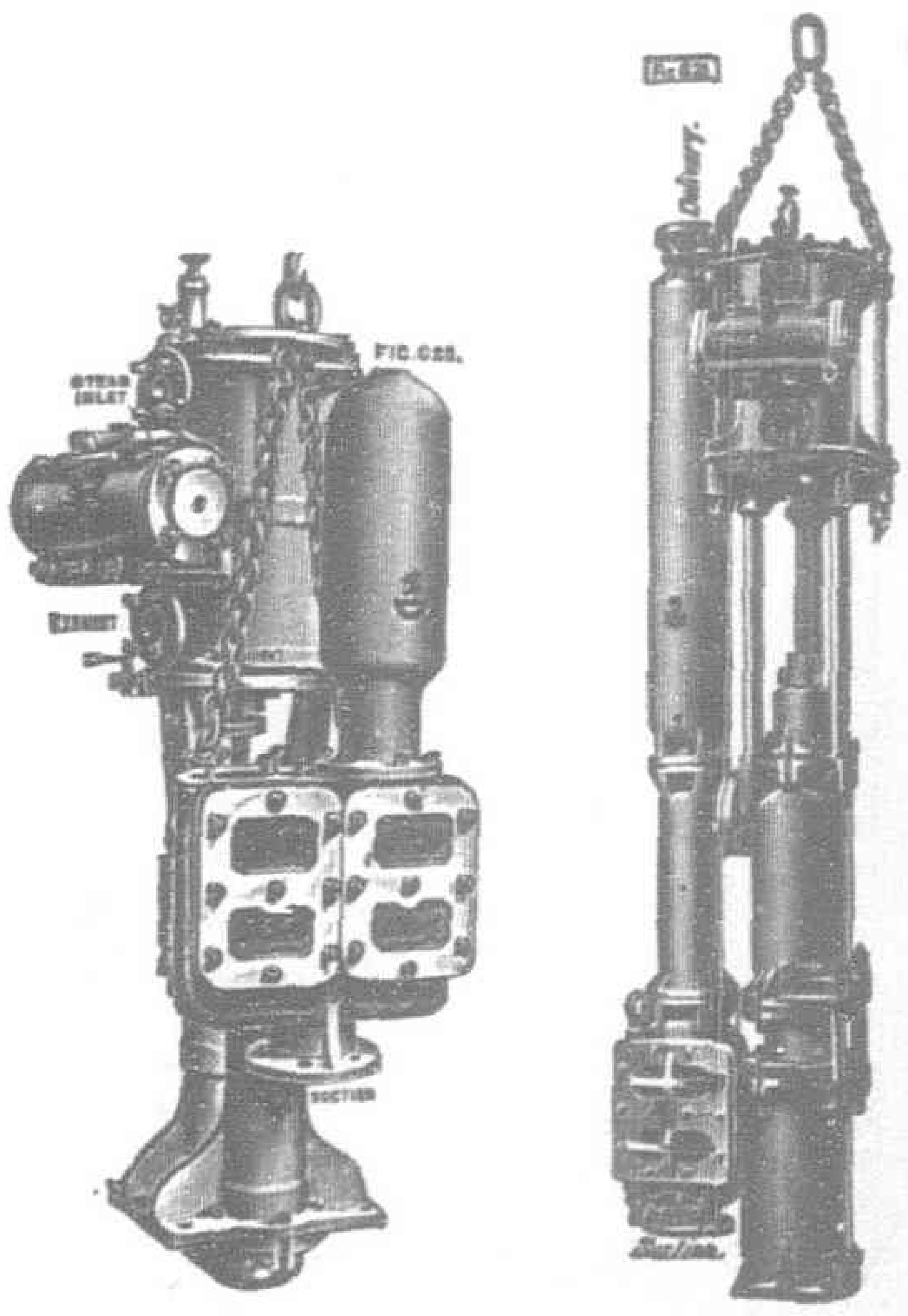


Steam Pump for General Purposes



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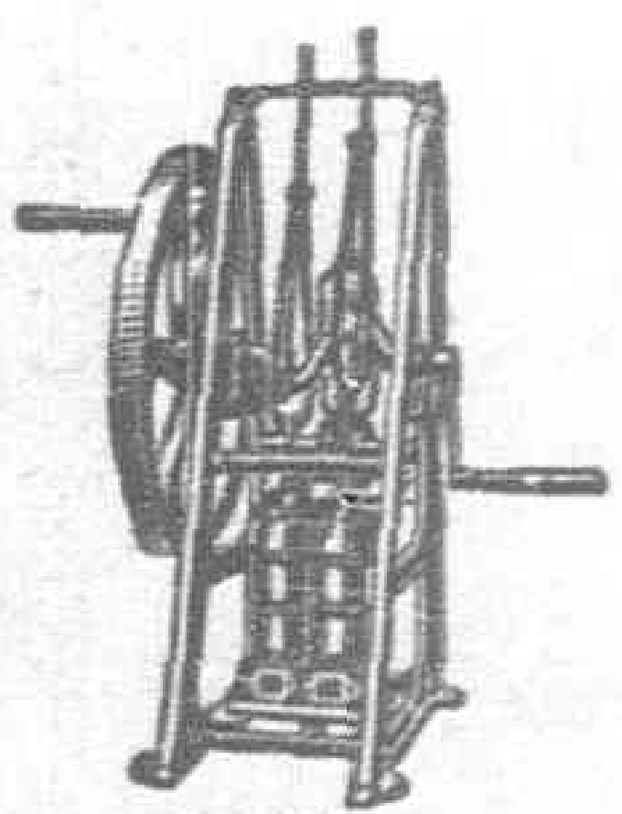
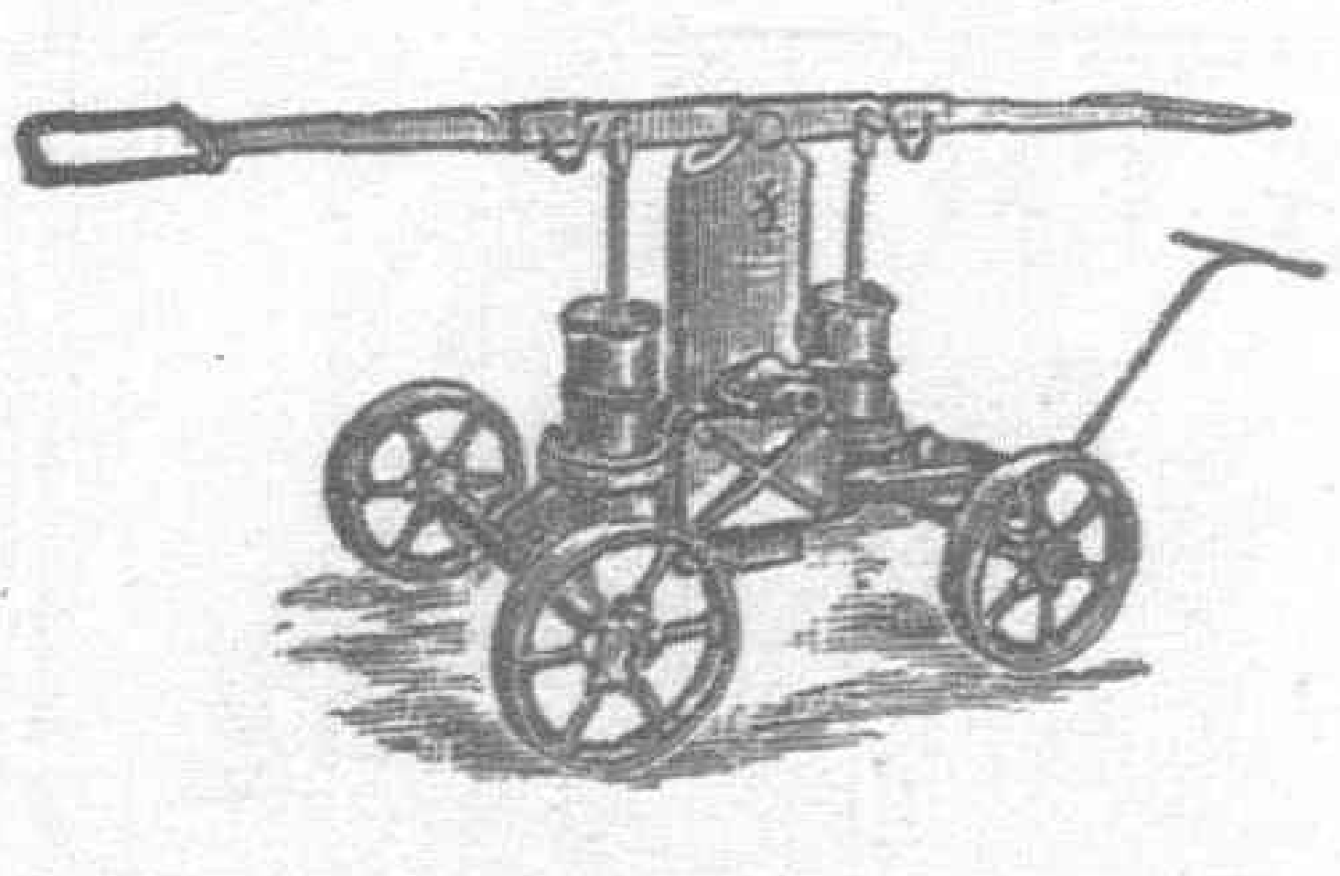


Fig.225.

Fig.160C.



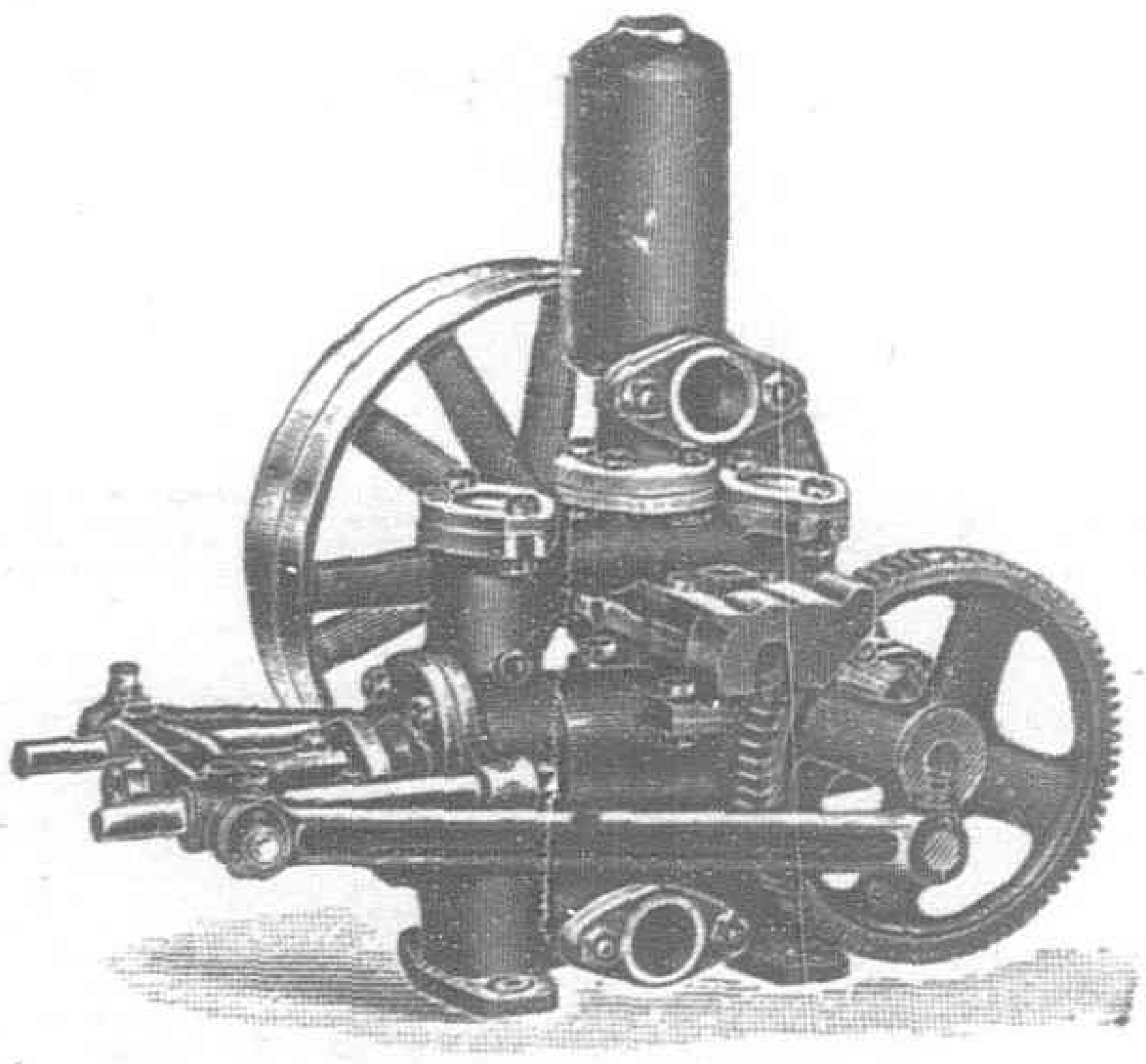


Fig. 831—Double Acting Belt Driven Pump

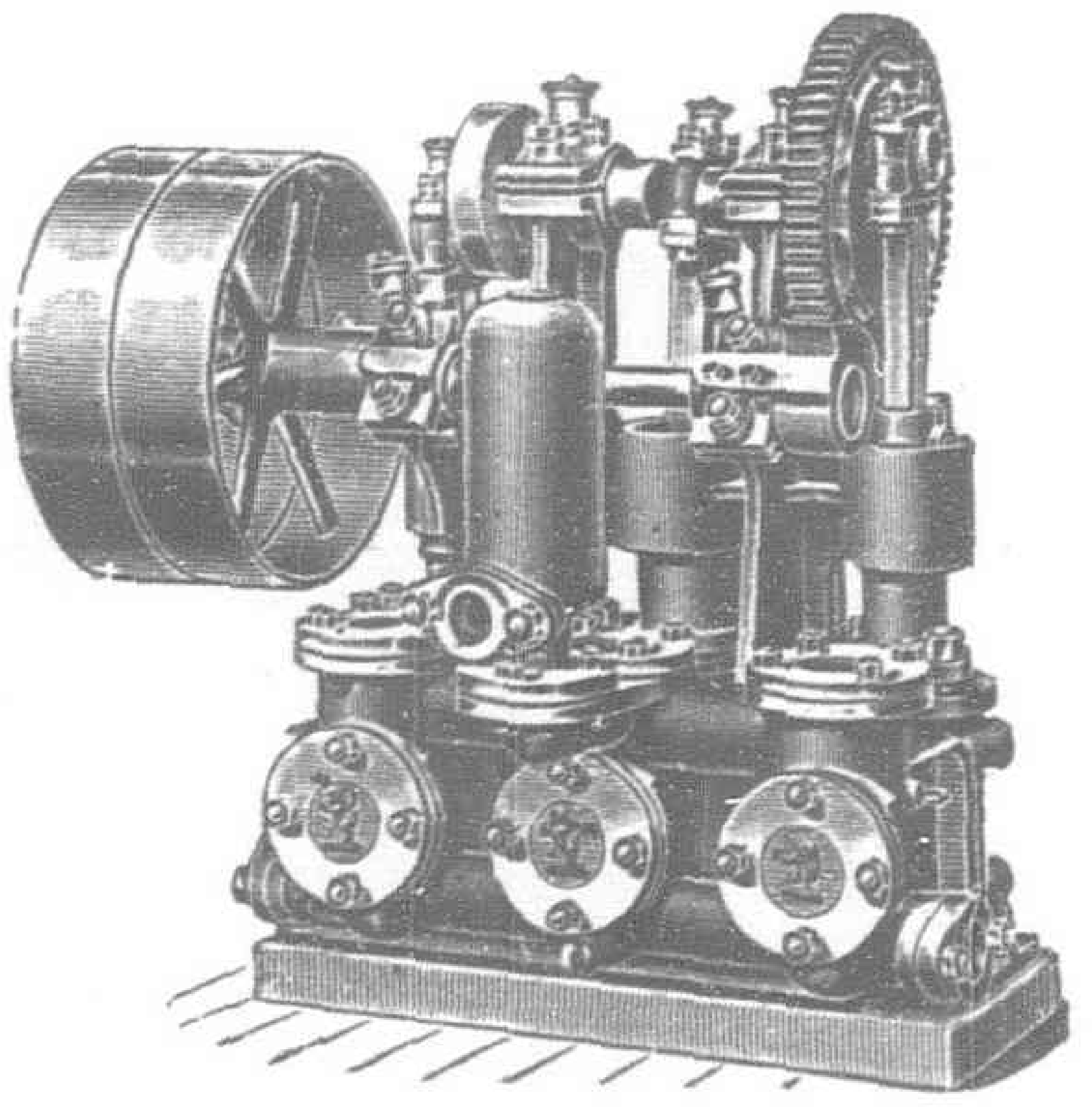
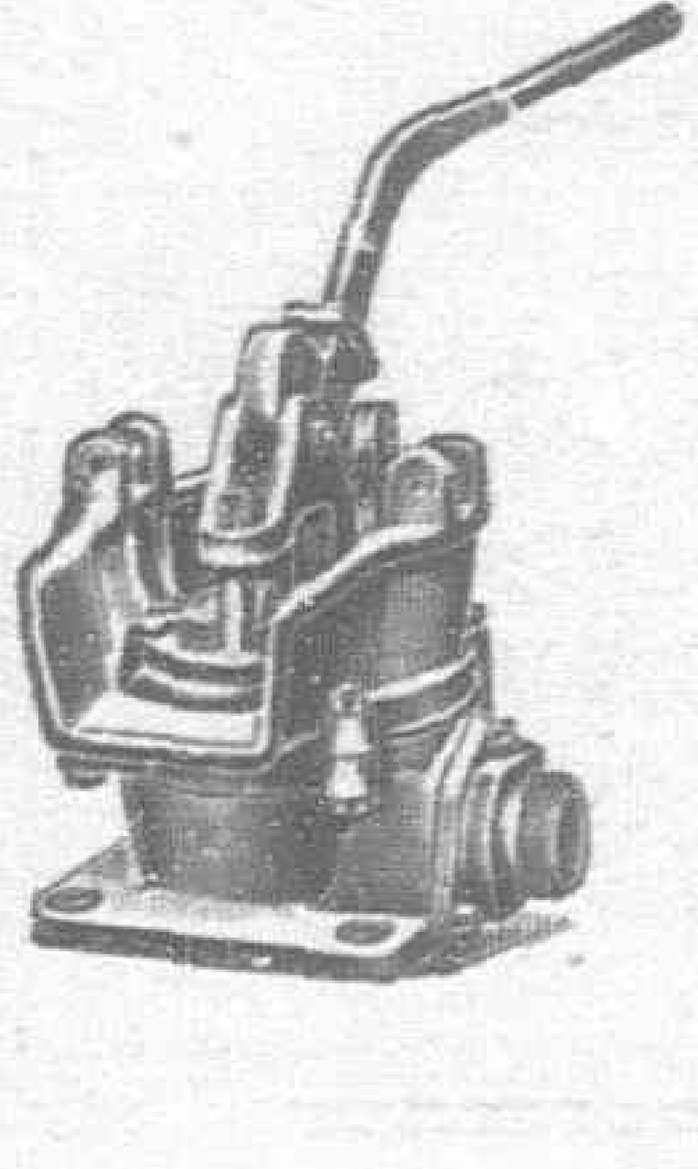


Fig. 842—Treble Ram Pump for Belt or Electric Drive

Fig.191.

Write for "Eastern" List.



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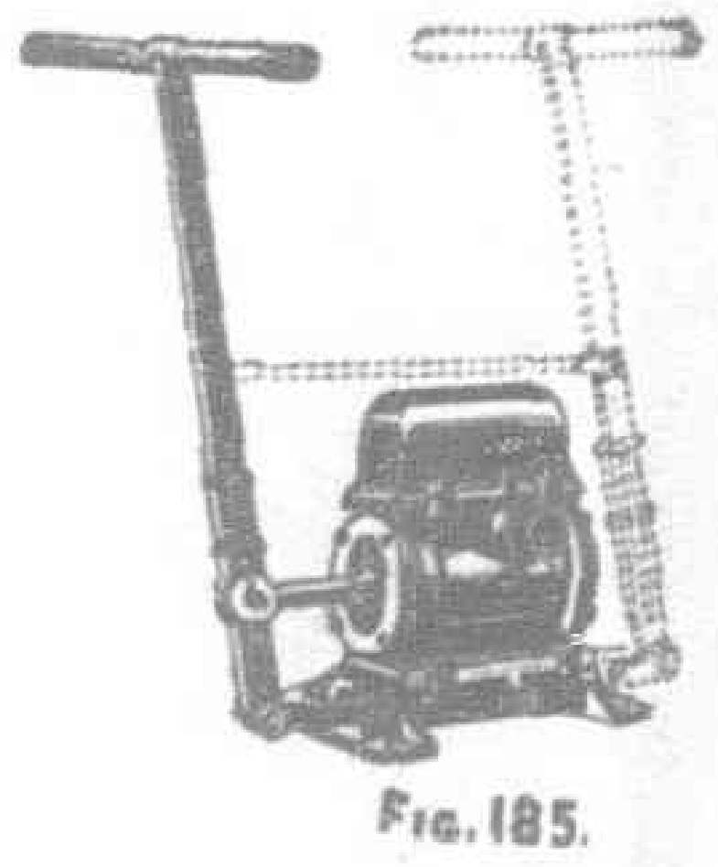

Fig.185.

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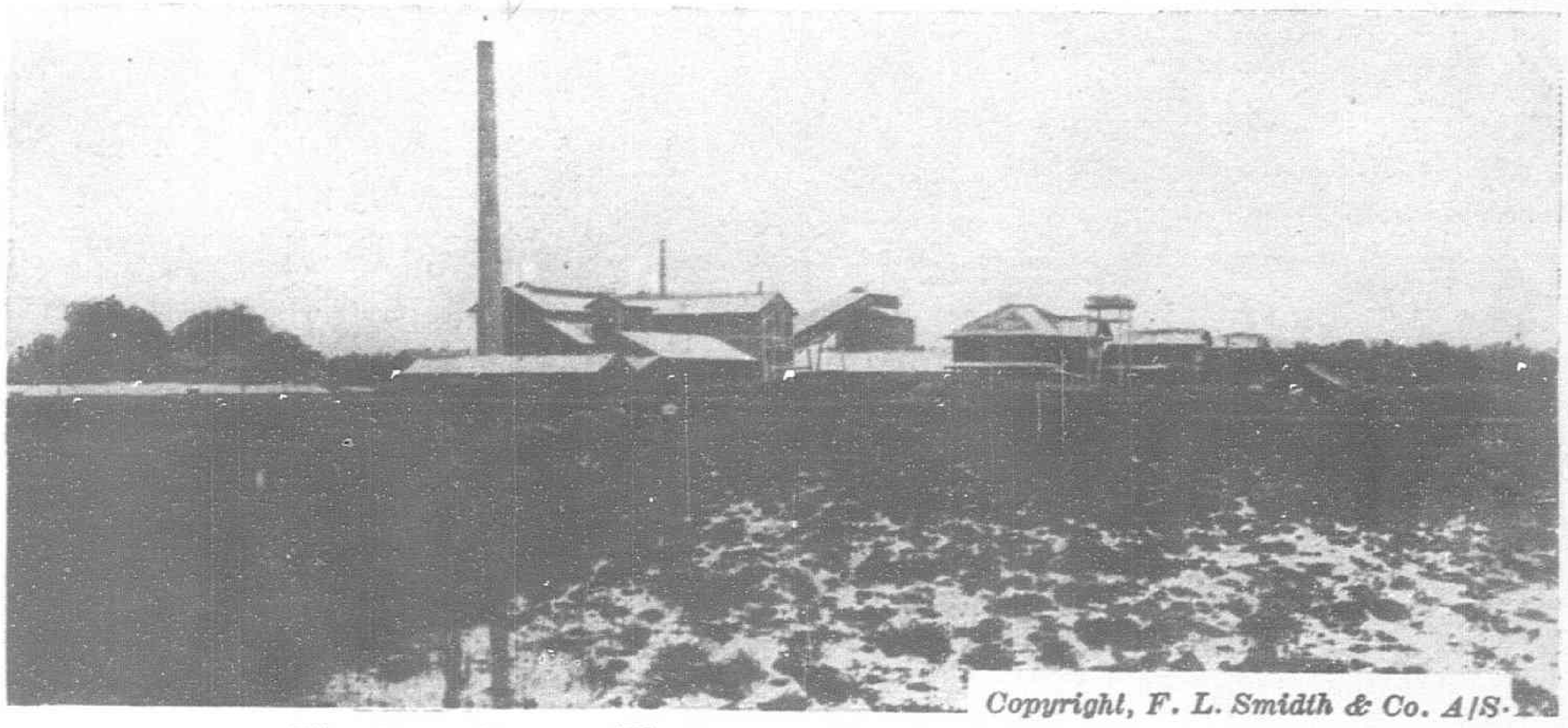

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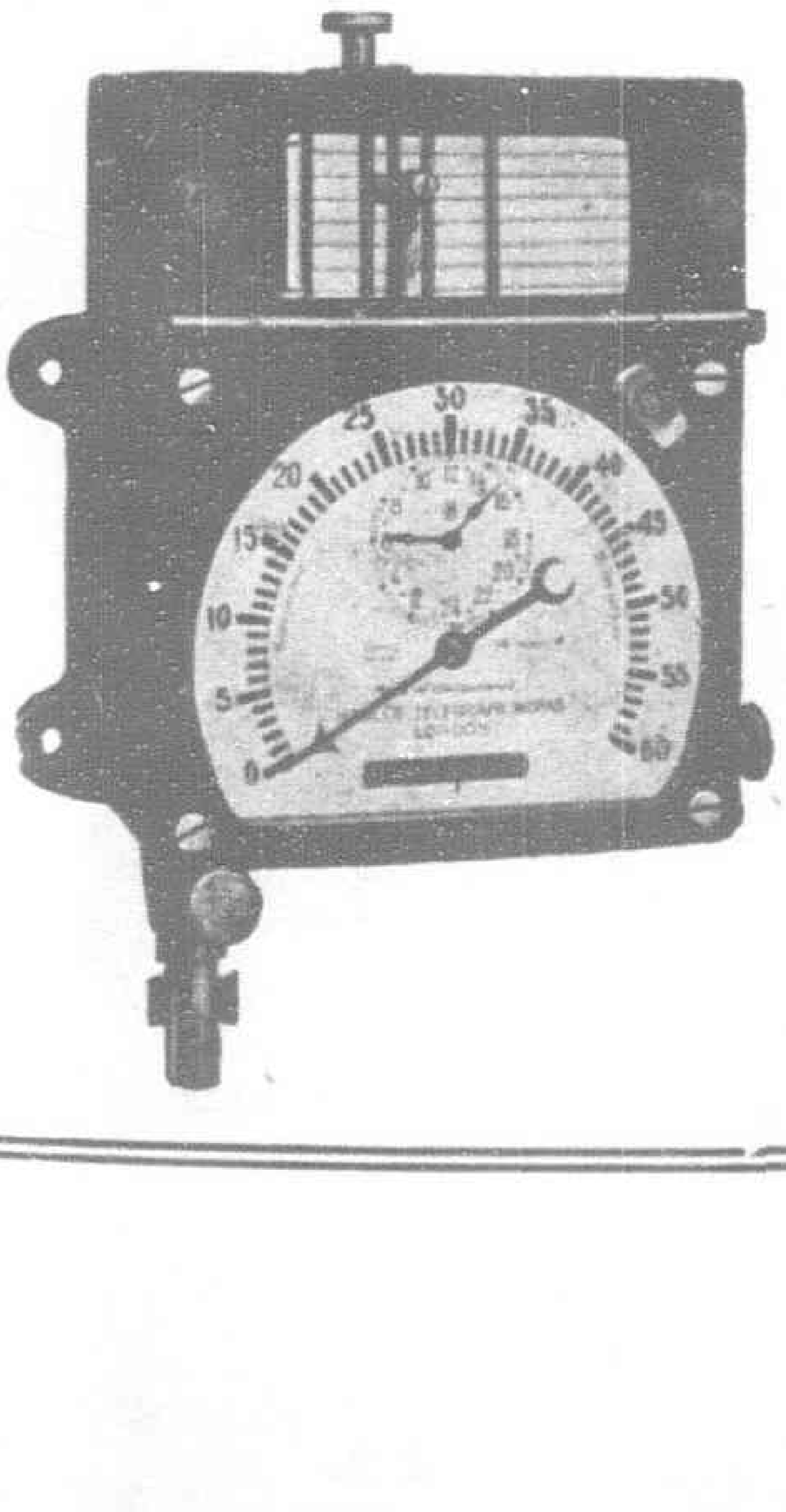

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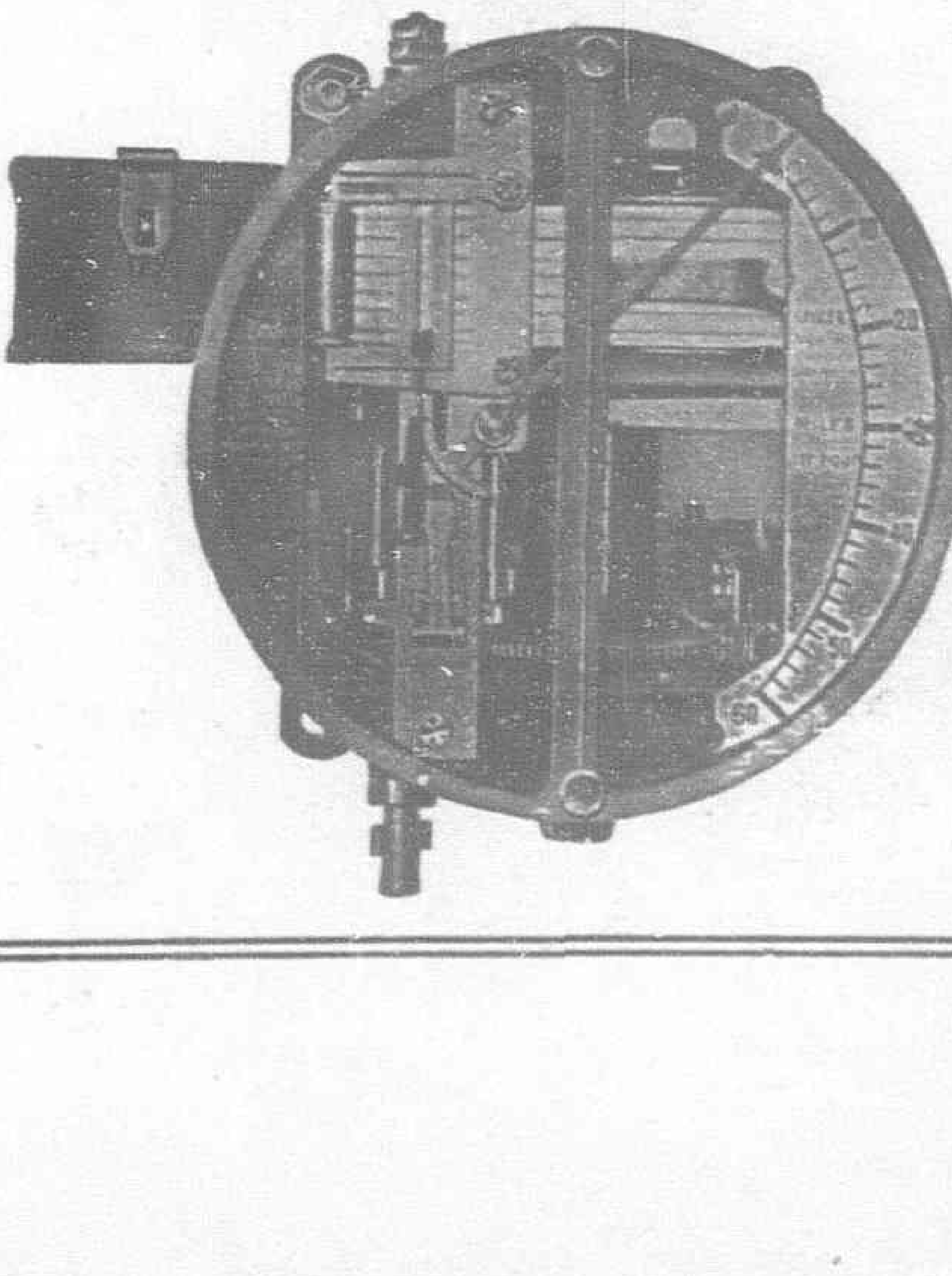

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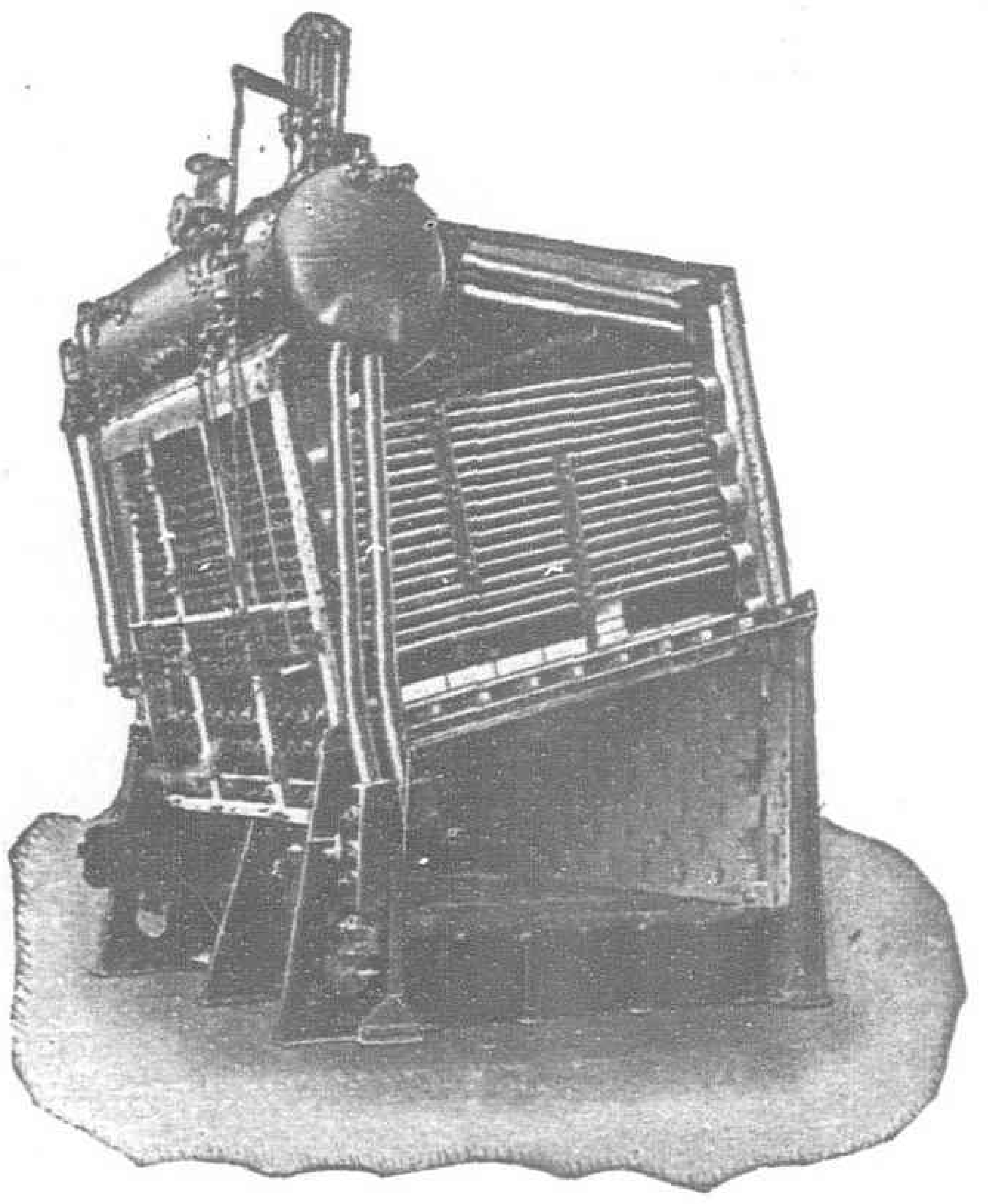

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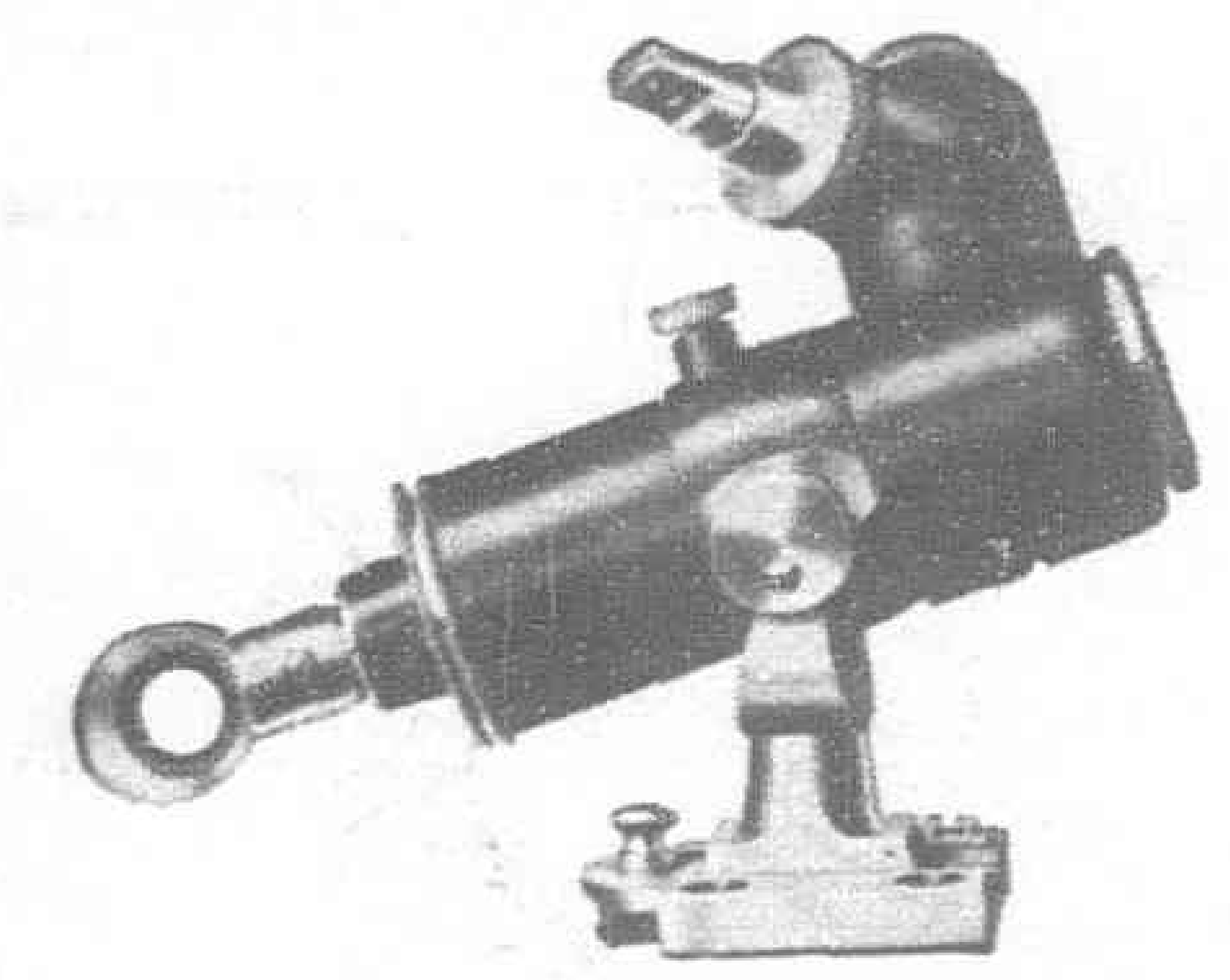

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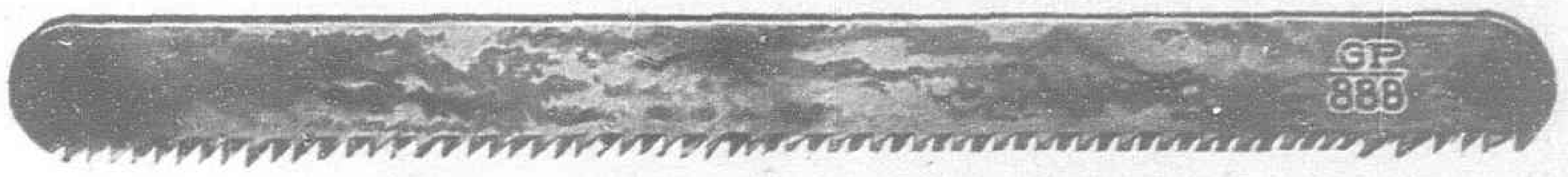

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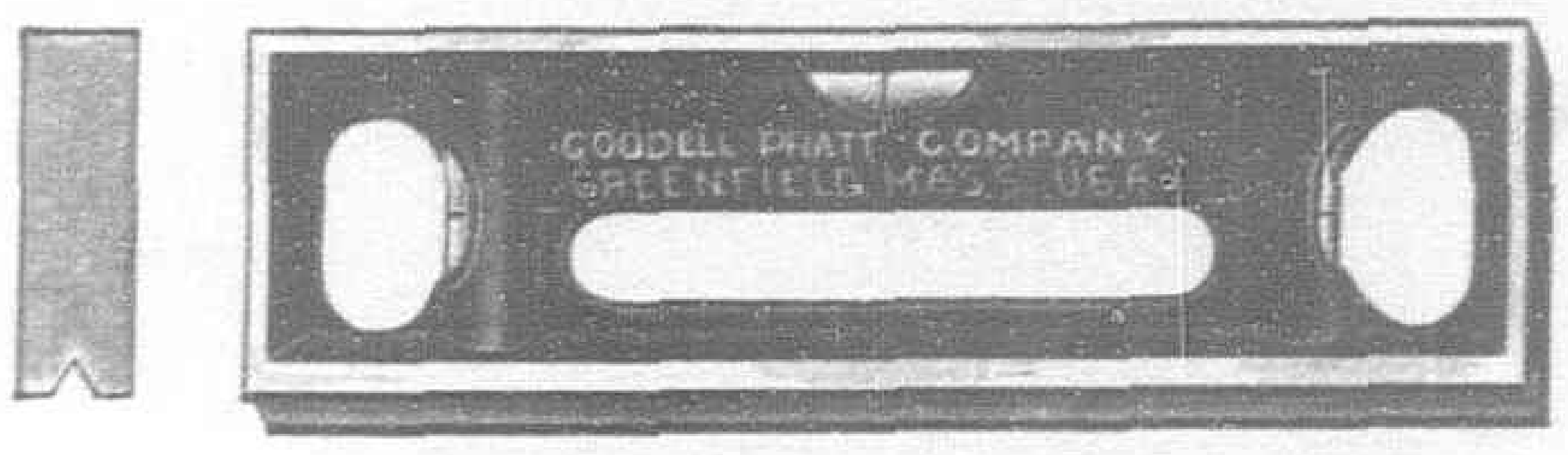

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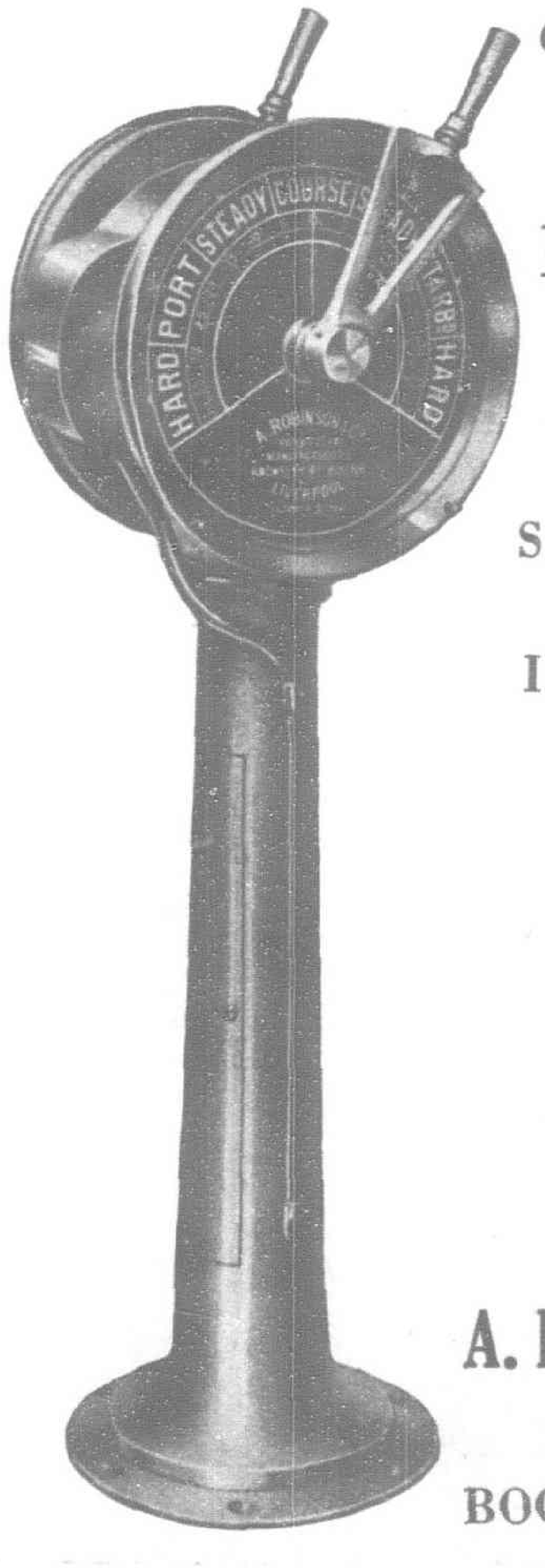

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For Home and Foreign Markets.

OUR EXPORT DEPARTMENT
IS REPRESENTED IN ALL THE IMPORTANT COMMERCIAL CENTERS OF THE WORLD AND CAN FURNISH PROMPTLY FULL INFORMATION AND QUOTATIONS REGARDING THE LARGE VARIETY OF TEXTILES MADE IN OUR MILLS

Fuji Gassed Spinning Company, Ltd.

(Fuji Gasu Boseki Kabushiki Kaisha)

Capital: Yen 38,000,000

STANDARD PRINTED
and
DYED COTTON and
SILK FABRICS

SHIRTINGS
PRINTS
DAMASKS
PONGEES
CREPES
SHEETINGS
CRETONNES
TOWELLING
ETC. ETC.
BROCADES
SILKS
DRILLS
FLANNELETTES
CREPES
SATINS

Head Office:
GOCHOME, OSHIMA-MACHI, NEAR TOKYO
Cable Address "FUHO"
Business Office:
SAKAMOTOCHO, NIHONBASHI-KU, TOKYO

JAPANESE

TEXTILES FOR EXPORT

DAI NIPPON BOSEKI KAISHA

Established 1889.

Capital - - - - - - - - - Y. 50,000,000
Reserve & Brought For'd. - Y. 46,017,000

MANUFACTURERS

of

All Sorts of Cotton Yarns and Cloths, Raw Silks and Spun Silks

Head Office

3-chome, Bingo-machi, Higashi-ku,
OSAKA.

President

Dr. K. KIKUCHI.

Factories:

Fifteen Mills at Home and
Two Mills in China

Number of Spindles:	Cotton Yarn	993,700
	Silk Yarn	47,500
Number of Weaving Machines:		9,100

NAIGAI WATA KABUSHIKI KAISHA

Established 1887.

Capital - - - - - - - Y. 16,000,000
Capital Paid-Up - - - Y. 13,250,000
Reserve - - - - - - - Y. 14,343,206.31

MANUFACTURERS

OF

COTTON YARN & CLOTH

Head Office

Dojima-kitamachi, Kitaku, OSAKA.

Factories in China:

Shanghai, Tsingtao, Chin-chou.

Number of Spindles:	Spinning	398,176
	Twisting	32,340
Number of Weaving Machines:		2,500

JAPANESE

TEXTILES FOR EXPORT

TOYO BOSEKI KAISHA

Manufacturers of

COTTON YARN; SHEETINGS, SHIRTINGS,
T-CLOTHS, DRILLS, JEANS, SATINS;
WHITE, DYED and PRINTED; SPUN SILK.

Head Office: DOJIMA HAMAORI, OSAKA.

President: FUSAJIRO ABE

OSAKA GODO COTTON SPINNING CO.

ESTABLISHED 1900

Capital (Full paid up) - - - -	**Yen 18,750,000**
Reserve and Brought Forward. - - -	**Yen 23,095,610**

Manufacturers of

COTTON YARNS, GREY and WHITE SHIRTINGS, JEANS and OTHER COTTON CLOTHS.

***Head Office*: 2-chome, Dojima-hamadori, Kita-ku, Osaka.**
***President*: H. AKIYAMA.**

FACTORIES: Nine Mills in Japan.

Number of Spindles:	**Spinning**	**436,184**
	Twisting	**63,976**
Number of Weaving Machines	... ...	**4,576**

The National City Bank of New York

1-A KIUKIANG ROAD, SHANGHAI

Head Office :

55 WALL STREET, NEW YORK, U.S.A.

CAPITAL, SURPLUS AND UNDIVIDED PROFITS

U.S. $242,973,145.00

Branches and Affiliates :

ARGENTINE
BELGIUM
BRAZIL
CHILE
CHINA
COLOMBIA
CUBA
DOMINICAN REPUBLIC
ENGLAND
FRANCE
HAITI
INDIA
ITALY
JAPAN
MEXICO
PERU
PHILIPPINE ISLANDS
PORTO RICO
REPUBLIC OF PANAMA
SPAIN
STRAITS SETTLEMENTS
URUGUAY
VENEZUELA

The Bank of Chosen

Capital Subscribed - - -	Yen 80,000,000
Capital Paid-up - - -	Yen 50,000,000

Governor: K. Nonaka, Esq.
Deputy-Governor: S. Suzuki, Esq.

Directors:

Y. Katayama, Esq.	M. Hashimoto, Esq
I. Iuchi, Esq.	T. Kakiuchi, Esq.

Head Office: SEOUL (Korea)

FOREIGN DEPARTMENT (TOKYO)

(All communications relating to correspondence arrangements and the Bank's general foreign business to be addressed to the Foreign Department)

Branch Offices:

Japan Proper—Tokyo, Osaka, Kobe, Shimonoseki

Korea—Chemulpo, Pyengyang, Fusan, Wonsan, Taiku, Chinnampo, Kunsan, Mokpo, Hoilyong, Chungjin

Manchuria—Antung, Mukden, New Town (Mukden), Dairen, Yingkow (Newchwang), Changchun, Harbin, Tiehling, Liaoyang, Ryojun, Kaiyuan, Chengchiatun, Szupingchieh, Fuchiatien, Kirin, Lungchingtsun

China Proper—Shanghai, Tientsin, Tsingtao, Tsinan

Siberia—Vladivostok, Alexandrofsky Port

NEW YORK AGENCY:

G. Benenson Investing Building, 165 Broadway, New York City

LONDON REPRESENTATIVE:

Palmerston House, 34 Old Broad Street, London, E.C. 2

Correspondents:

San Francisco, Seattle, New York, London, Paris and in Other Commercial Centers throughout the World

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Industrial Bank of Japan, Limited

(NIPPON KOGYO GINKO)

Incorporated by Special Charter in 1902 to Encourage Foreign Investments

Capital Subscribed - - - Yen 50,000,000

Head Office: 7 Eiraku-cho, Nichome, Marunouchi, Tokyo.
Cables: "Kogin," Tokyo

BRANCHES:

Tokyo: Nihonbashi *Osaka:* Koraibashi
Kobe: Nakamachi

SHIMAKICHI SUZUKI, Esq., *President*

DIRECTORS:

Kozo Matsumoto, Esq. Ichimatsu Horai, Esq.
Keikichi Amanoya, Esq.

AUDITORS:

Takahide Yoshikawa, Esq. Teizo Iwasa, Esq.
Viscount Takamasa Hachijo

All descriptions of general banking, exchange, both foreign and domestic, and trust and corporation financial business transacted.

Correspondents in the principal cities at home, and in London, Paris, New York, and San Francisco.

Business Transacted:

1.—Loans on the security of public bonds, of debentures and shares, estates (Zaidan), specified land and buildings.

2.—Subscription and underwriting public bonds or debentures.

3.—Deposits and safe custody of valuables.

4.—Trust company business.

5.—Discounting of bills.

6.—Foreign exchange business.

7.—Other banking business sanctioned by the Minister of State for Finance in accordance with Law of Ordinance.

Hongkong and Shanghai Banking Corporation

(INCORPORATED IN HONGKONG)

Capital: Authorised Capital $50,000,000
Issued and fully paid up ... $20,000,000

Reserve Funds: Sterling £6,500,000
Silver ... ... $ 9,500,000
Reserve Liability of Proprietors $20,000,000

Court of Directors

J. A. PLUMMER, Esq. Chairman
Hon. Mr. C. G. S. MACKIE, Deputy Chairman
W. H. BELL, Esq.
A. H. COMPTON, Esq.
B. LANDER LEWIS, Esq.
G. MISKIN, Esq.
Hon. Mr. J. J. PATERSON
T. E. PEARCE, Esq.
T. H. R. SHAW, Esq.
J. P. WARREN, Esq.

Head Office:
HONGKONG

Chief Manager:
V. M. GRAYBURN, Esq., Hongkong.

London Bankers:
THE WESTMINSTER BANK, LTD.

Shanghai Branch: 12 The Bund
Sub-Agency: 27 Broadway

Branches and Agencies:

AMOY
BANGKOK
BATAVIA
BOMBAY
CALCUTTA
CANTON
CHEFOO
COLOMBO
DAIREN
FOOCHOW
HAIPHONG
HAMBURG
HANKOW
HARBIN
ILOILO
IPOH
JOHORE
KOBE
KOWLOON (Hongkong)
KUALA LUMPUR
LONDON
LYONS
MALACCA
MANILA
MOUKDEN
MUAR(Johore)
NAGASAKI
NEW YORK
PEIPING
PENANG
RANGOON
SAIGON
S. FRANCISCO
SHANGHAI
SINGAPORE
SOURABAYA
SUNGEIPATANI
TIENTSIN
TOKYO
TSINGTAO
YOKOHAMA

Interest allowed on Current Accounts and on Fixed Deposits according to arrangement.

Local Bills Discounted. Credits granted on approved Securities and every description of Banking and Exchange business transacted. Drafts granted on London and the chief commercial places in Europe, India, Australia, Africa, China, Japan and America. Safe Deposit Boxes to rent. Terms on application.

SAVINGS BANK OFFICE

Accounts will be kept either in Dollars or Taels, Local Currency, at the option of the Depositor.
Deposits of less than $1 or Tl. 1 will not be received.
Not more than $200 or Tls. 200 will be received during one month from any single Depositor.
Interest at the rate of 3% per annum will be allowed upon the monthly minimum balance.
The maximum balance on which interest will be allowed is $5,000 or Tls. 5,000.
Deposits may be withdrawn on Demand.
Depositors will be provided with Pass Books in which all transactions will be entered. Pass Books must be presented when paying in or withdrawing money.

Office Hours—10 a.m. to 3 p.m. Saturdays 10 a.m. to Noon.

A. B. LOWSON, *Manager.*

The Kawasaki-One Hundredth Bank, Ltd.

HEAD OFFICE: YOROZU-CHO, TOKYO

Phone: Nihombashi 141, 3105

SHO HOSHINO, *President*

Special facilities offered for foreign residents and corporations in Japan
Interest allowed on current and time deposits. Safe deposit box rented

BRANCHES AND AGENCIES:

Yokohama, Kobe, Kyoto, Osaka and 78 others in principal cities in Japan

CAPITAL PAID YEN 150,000,000

SUMITOMO GOSHI-KAISHA

OSAKA, JAPAN

OWNERS OF COPPER MINES, SILVER AND GOLD MINES AND COAL MINES, ETC.

OFFICES AND DEPARTMENTS

Mining Offices	Kohnomai & Ohgayu	Sales Departments	Osaka, Tokyo, Yokosuka, Nagoya, Kobe, Kure, Hakata and Shanghai
Forestry Department	Osaka		

The Sumitomo Steel Works, Limited
OSAKA, JAPAN
Capital Subscribed : Yen 12,000,000

The Sumitomo Electric Wire & Cable Works, Ltd.
OSAKA, JAPAN
Capital Subscribed : Yen 10,000,000

The Sumitomo Steel Tube & Copper Works, Ltd.
OSAKA, JAPAN
Capital Subscribed : Yen 15,000,000

The Sumitomo Fertilizer Works, Limited
Capital Subscribed : Yen 10,000,000
Head Office: Osaka, Japan Works: Niihama, Iyo, Japan

The Sumitomo Besshi Mine, Limited
Capital Paid: Yen 15,000,000
Head Office: Niihama, Iyo, Japan Branch: Osaka, Japan

The Sumitomo Warehouse Company, Limited
Capital Paid : Yen 15,000,000
Head Office: Osaka, Japan Branches: Osaka, Kobe & Tokyo

The Sumitomo Trust Company, Limited
Capital Subscribed: Yen 20,000,000
Head Office: Osaka, Japan Branches : Tokyo & Fukuoka, Japan
Authorized to Exercise all Trust Powers for Individuals and Corporations.

The Sumitomo Life Insurance Company, Limited
OSAKA, JAPAN
Capital Subscribed: Yen 1,500,000

The Sumitomo Collieries, Limited
Capital Paid: Yen 15,000,000
Head Office: Osaka, Japan Branches: Wakamatsu & Otaru

ESTABLISHED : 1895 INCORPORATED : 1912

THE SUMITOMO BANK, LTD.

KITAHAMA, OSAKA, JAPAN

Subscribed Capital	Yen 70,000,000
Paid-up Capital	Yen 50,000,000
Reserve Funds	Yen 28,690,000

DIRECTORS:

K. YUKAWA, Esq.	Chairman of Board of Directors
N. YATSUSHIRO, Esq.	Chief Managing Director
K. KAGA, Esq.	Managing Director
K. OHDAIRA, Esq.	,, ,,
BARON K. SUMITOMO	Director
K. HORI, Esq.	,,
S. IMAMURA, Esq.	,,
S. KOH, Esq.	,,
H. OKAHASHI, Esq.	,,

Home Branches: Osaka (26), Tokyo (17), Yokohama, Nagoya (2), Kyoto (3), Kobe (3), Okayama, Onomichi, Niihama, Kure, Hiroshima (3), Yanai, Shimonoseki, Moji, Kokura, Wakamatsu, Fukuoka (2), Kurume (2), Kumamoto.

Offices in Pacific Liners: M. S. "Asama Maru," M. S. "Chichibu Maru," M. S. "Tatsuta Maru."

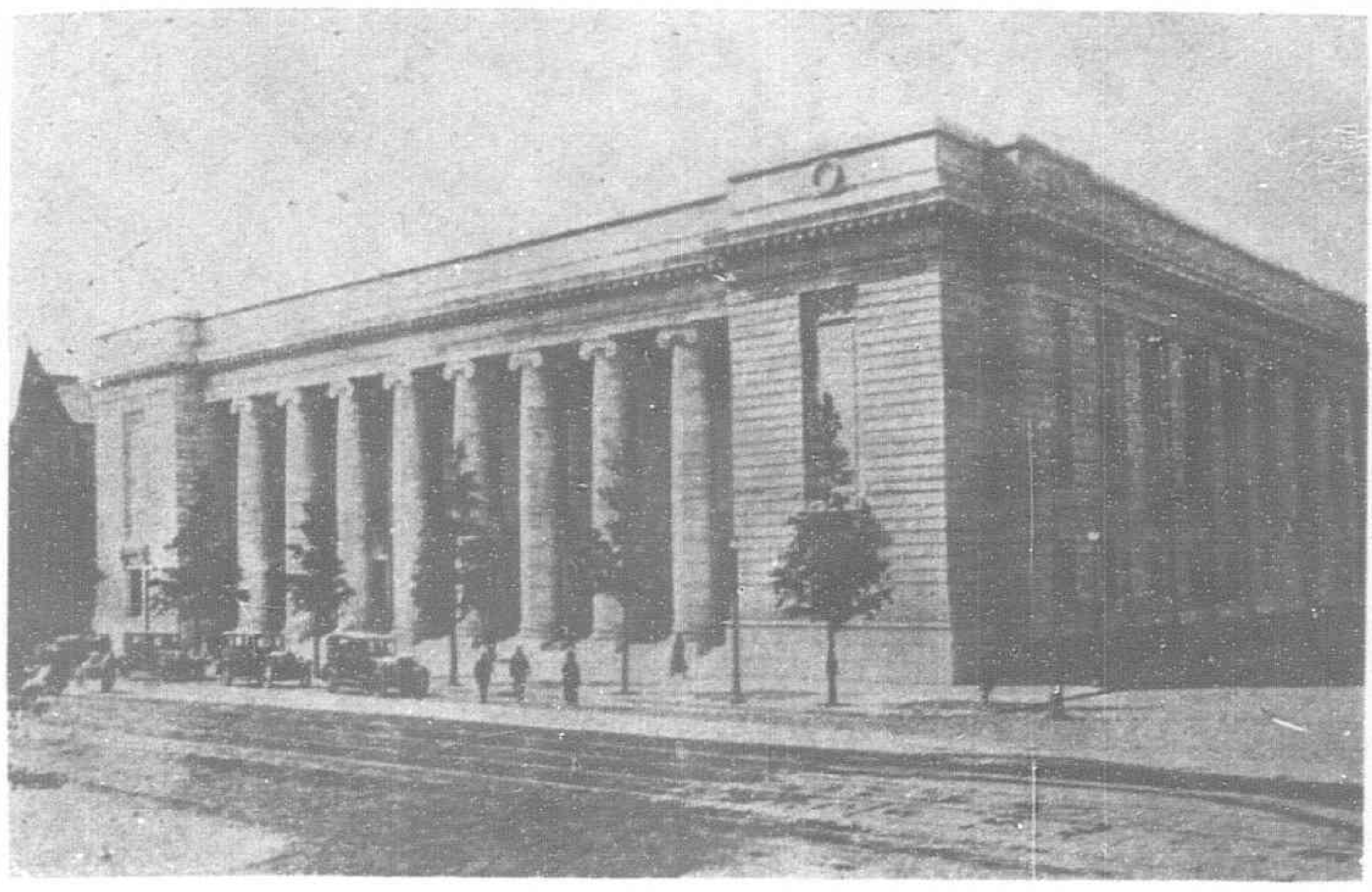
Foreign Branches: London, New York, San Francisco, Los Angeles, Bombay, Shanghai and Hankow.

Affiliated Banks: The Sumitomo Bank of Hawaii, Limited, Honolulu. The Sumitomo Bank of Seattle, Seattle. The Sumitomo Bank of California, Sacramento, Cal.

Bankers: Lloyds Bank, Limited, London. National City Bank of New York, New York. Lloyds and National Provincial Foreign Bank, Limited, Paris.

Correspondents: Established in all important places at home and abroad.

The Bank buys, sells and receives for collection Drafts and Telegraphic Transfers; issues Commercial and Travellers' Letters of Credit available in all important parts of the world, and acts as Trustee for Mortgage Bond, besides doing General Banking Business.



Mitsubishi Bank, Tokyo

THE MITSUBISHI BANK,
LIMITED

CAPITAL - - - - - - -	Yen 100,000,000
RESERVE FUND - - -	Yen 42,050,000

CHAIRMAN:
Mr. Manzo Kushida

MANAGING DIRECTORS:
Mr. Kiyoshi Sejimo Mr. Takeo Kato
Mr. Sobun Yamamuro

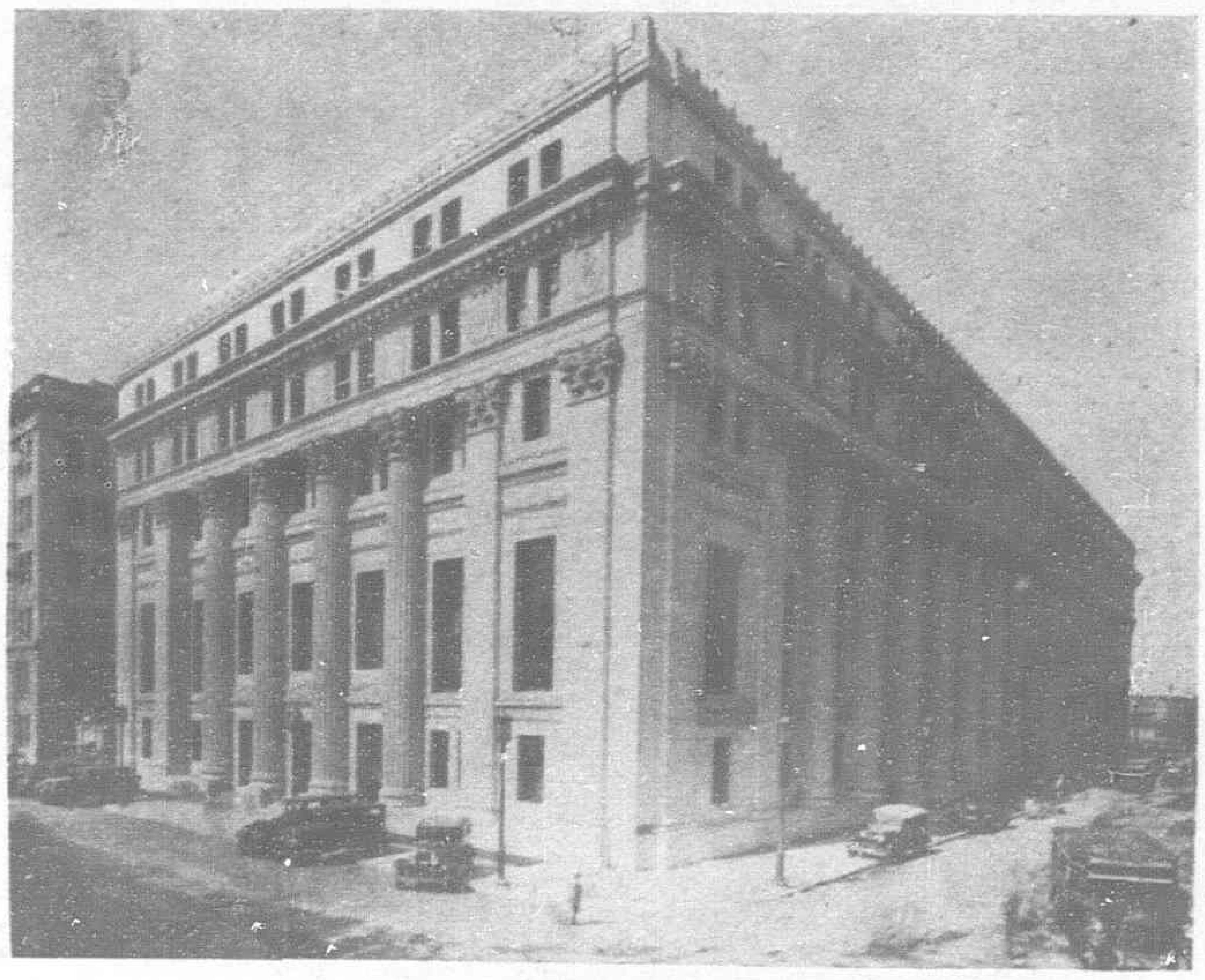
HEAD OFFICE:
No. 5, Marunouchi, Nichome, Kojimachi-ku,
Tokyo.

BRANCHES HOME:

Eitaibashi (Tokyo). Tokio Kaijo Building (Tokyo), Marunouchi Building (Tokyo), Nihombashi (Tokyo), Yotsuya (Tokyo), Komagome (Tokyo), Nihombashi-Toricho (Tokyo), Kanda (Tokyo), Shinagawa (Tokyo), Omori (Tokyo), Osaka, Nakanoshima (Osaka), Senba (Osaka), Nishinagahori (Osaka), Kobe, Sannomiya (Kobe), Kyoto, Nagoya, Otaru.

BRANCHES OVERSEAS:

Shanghai Office: No. 2, Kiukiang Road, Shanghai.
London Office: No. 3, Birchin Lane, Cornhill, London, E.C.3.
New York Office: No. 120, Broadway, New York.



Mitsui Bank, Tokyo

THE MITSUI BANK, LTD.

The Oldest Bank in Japan, Founded in 1673

Capital Subscribed................Y.	100,000,000
Capital Paid-Up....................Y.	60,000,000
Reserve Funds......................Y.	65,200,000

HEAD OFFICE: TOKYO
No. 1 Surugacho, Nihonbashi-ku

Home Branches:

FUKUOKA, HIROSHIMA, KOBE, KYOTO, MARUNOUCHI (Tokyo), MOJI, NAGASAKI, NAGOYA, NIHONBASHI (Tokyo), OSAKA, OSAKA-DOJIMA, OSAKA-KAWAGUCHI, OSAKA-NISHI, OTARU, SHIMONOSEKI, WAKAMATSU (Kyushu), YOKOHAMA.

Foreign Branches:

Bombay, London, New York, Shanghai, Sourabaya.

London Bankers:
Barclays Bank, Ltd. Midland Bank, Ltd.

New York Bankers:
Bankers Trust Co. Chase National Bank.
National City Bank of New York.

BANK OF CHINA

LIMITED

Capital and Reserve $25,747,017

BANK OF PROGRESS

Annual Deposits

1925	$259,718,066
1926	$328,481,010
1927	$330,496,947
1928	$387,688,787
1929	$438,096,590

Head Office:

22 THE BUND, SHANGHAI

Overseas Branch :

34 Old Broad St., London, E.C.2.

THE BANK OF TAIWAN, LTD.

Incorporated By
Special Imperial Charter 1899

Shanghai Branch:

No. 16 The Bund
S. Kondo, Manager
Telephones:—Central 1331 (Manager's Office),
8796 to 8800 (Private Exchange to all Departments),
2814 (Compradore's office).

Head Office :

Taipeh Taiwan

Branches and Agencies :

Japan :	Tokyo (Central Office), Kobe, Osaka, Yokohama.
Taiwan :	Giran, Heito, Kagi, Karenko, Keelung, Makong, Nanto, Shinchiku, Taichu, Tainan, Takao, Taito, Tansui, Toen.
China :	Amoy, Canton, Dairen, Foochow, Hankow, Shanghai, Swatow.
Java :	Batavia, Semarang, Soerabaja.
India :	Bombay, Calcutta.
Others :	Hongkong, London, New York, Singapore.

London Bankers:

Barclays Bank, Ltd. Lloyds Bank, Ltd.
Midland Bank, Ltd. Westminster Bank, Ltd.

Correspondents :

Throughout the Principal Cities of the World.

THE DAI-ICHI GINKO, LTD.

(FORMERLY THE FIRST NATIONAL BANK)

ESTABLISHED 1873

Capital (Paid Up) - - - -	Yen 57,500,000.00
Reserve Fund - - - - -	Yen 57,500,000.00
Special Reserve Fund - - -	Yen 7,350,000.00
Undivided Profits - - -	Yen 1,839,086.87

BOARD OF DIRECTORS:

Y. SASAKI, Esq., *Chairman*
K. ISHII, Esq., *Vice-President*
S. SUGITA, Esq., T. AKASHI, Esq., *Managing Directors.*
Y. OHSAWA, Esq., *Managing Director.*
Directors: Y. NOGUCHI, Esq., K. NOGUCHI, Esq., K. SHIBUSAWA, Esq., T. KANOH, Esq.
Auditors: T. DOKI, Esq., J. TAKEYAMA, Esq., K. SAIONJI, Esq.

HEAD OFFICE:

No. 1 KABUTO-CHO, NIHONBASHI-KU, TOKYO.
T. AKASHI, *Manager* T. INOUYE, *Sub-Manager* S. SASAKI, *Sub-Manager*

CITY BRANCHES:

Akasaka, Asakusa, Azabu, Fukagawa, Ginza, Gofukubashi, Hibiya, Hongo, Honjo, Horidome, Horiecho, Kanda, Komagata, Kyobashi, Marunouchi, Mita, Muromachi, Shinjuku, Ushigome.

HOME BRANCHES:

Ashikaga, Fukuoka, Fushimi, Gojo (Kyoto), Hakodate, Honmachi (Osaka), Hyogo (Kobe), Kiryu, Kobe, Kokura, Kumamoto, Kurume, Kyomachi (Kobe), Kyoto, Marutamachi (Kyoto), Minamiku (Osaka) Moji, Muroran, Nagoya, Nishijin (Kyoto), Nishiku (Osaka), Osaka, Otaru, Sano, Sapporo, Shimonoseki, Tamayacho (Nagoya), Tatebayashi, Tochigi, Toyohashi, Utsunomiya, Yokkaichi, Yokohama.

BRANCHES IN KOREA:

FUSAN, SEOUL.

LONDON & NEW YORK AGENTS:

London: Westminster Bank, Ltd.; Midland Bank, Ltd.; The Yokohama Specie Bank, Ltd.
New York: The National City Bank of New York.; Guaranty Trust Co. of New York.; The Yokohama Specie Bank, Ltd.

CORRESPONDENTS:

The Bank, in addition to its own Branches, has numerous Agents or Correspondents in the principal Cities and Towns at Home and Abroad.

BANK OF COMMUNICATIONS

Established in 1908

Under Special Charter of the National Government as an Industrial Bank.

CAPITAL - - - - - - - - - $10,000,000

HEAD OFFICE: 14 THE BUND, SHANGHAI

Branches and Sub-Branches throughout China and Agencies in Foreign Countries. Every description of Banking Business transacted. Transfers made to all parts of China and Abroad. Interest allowed on Current Accounts and Fixed Deposits. Privileged to issue Banknotes and to act as a Government Depository. Specially authorized to handle Bond Issues for Central and Local Governments and also Public Funds of Government Communications Enterprises. Facilities for development of Industry and Commerce extended.

Chairman of the Board: LU HSUEH-PU
General Manager: T. D. WOO
Managing Directors: YIKAO KOU, CHEN-YI LI, Y. M. CHIEN
Manager, Shanghai Branch: S. M. TONG

BUSINESS FOUNDED 1795

American Bank Note Co.

Head Office: 70 Broad Street, New York
Shanghai Office: 1 Foochow Road

ITS work is the engraving and printing of bank notes, postage stamps, bonds, stock certificates, bills of exchange, letters of credit and all other documents requiring safeguards to prevent counterfeiting. All securities are made in a plant devoted exclusively to that purpose.

THE CHEKIANG INDUSTRIAL BANK, LTD.

(MEMBER OF THE SHANGHAI CHINESE BANKERS' ASSOCIATION)

ESTABLISHED 1908

CAPITAL - - - - - - - - - - - -	$2,000,000
RESERVE FUND - - - - - - - - - -	$1,000,000
SAVINGS DEPARTMENT—Capital - - - - -	$200,000
,, ,, —Reserve Fund - - - -	$200,000

HEAD OFFICE: 13-14 Hankow Road, Shanghai. *Cable Address:* CHINDUBANK, SHANGHAI.

BRANCHES: Hongkew Sub-branch, 53 Broadway. Hankow Office, Hupeh Road. Hangchow Office, 76-77 Pao Yue Fong.

DOMESTIC AGENCIES: In the principal cities throughout China.

FOREIGN CORRESPONDENTS: ENGLAND: The National Provincial Bank, Ltd., London. UNITED STATES: International Acceptance Bank, Inc., New York. Harriman National Bank, New York. First National Bank of Chicago, Chicago. Bank of Italy, San Francisco. Los Angeles—First National Trust & Savings Bank, Los Angeles. GERMANY: Messrs. M. M. Warburg & Co., Hamburg. Messrs. Hugo Oppenhiem & Sohn, Berlin. FRANCE: Lloyds & National Provincial Foreign Bank, Ltd., Paris. BELGIUM: Lloyds & National Provincial Foreign Bank, Ltd., Brussels. HOLLAND: Rotterdamsche Bankvereeniging, Rotterdam. JAPAN: The Dai Ichi Ginko, Ltd., Tokyo, Yokohama, Kobe, Osaka, Hakodate, Seoul and Fusan.

All Descriptions of General Banking and Exchange, Both Foreign and Domestic, Transacted, Imports and Exports Financed, Bonds and Shares Bought and Sold, Savings Accounts Opened, and Safe Deposit Boxes for Rent.

LI MING, *General Manager.*

THE YASUDA BANK, LTD.

Head Office: EIRAKU BUILDING, TOKYO.

CAPITAL SUBSCRIBED - - - - - - - - - - - - Yen 150,000,000

Chairman of the Board:
Zenjiro Yasuda, Esq.

Deputy Chairman:
Hirozo Mori, Esq.

Managing Directors:
Hisashi Hyosu, Esq.
Junzo Saito, Esq.
Hisomu Sonobe, Esq.
Yuzo Hamada, Esq.

The Bank is now in command, not only of 140 Branches in Japan, but also of the services which it has secured from many correspondents throughout the world, and is able to offer accommodation for every kind of banking facilities, foreign and domestic.

Foreign Business:
TOKYO HEAD OFFICE
YOKOHAMA OFFICE, Honcho
OSAKA OFFICE, Koraibashi
KOBE OFFICE, Sakaemachidori

MITSUBISHI MARINE AND FIRE INSURANCE CO., LTD.

(Mitsubishi Kaijo Kasai Hoken Kabushiki Kaisha)

Underwriters for

Marine, Fire, Transport, Automobile, Burglary and Personal Accident Insurances of every Description

Head Office:
MARUNOUCHI, TOKYO

Cable Address:
"INSURER"

CAPITAL - - - - - - Yen 5,000,000
RESERVE FUND - - - - ,, 12,380,000

Branches and Agencies:

LONDON, NEW YORK, OSAKA, KOBE, SHANGHAI, AND OTHER IMPORTANT CITIES AND PORTS OF THE WORLD

MITSUBISHI TRUST CO., LTD.

Subscribed Capital - - - Yen 30,000,000
Paid-up Capital - - - - ,, 7,500,000

Chairman:
Mr. Kenkichi Kagami

Managing Directors:
Mr. Hidemi Tamura Mr. Yasuichi Miyagawa

Head Office:
No. 6 Marunouchi, Nichome, Kojimachi-ku, Tokyo.

Branch Office:
No. 1 Sozecho, Kita-ku, Osaka.

LEAGUE OF NATIONS

Publication of the International Labour Office

INTERNATIONAL LABOUR REVIEW

The International Labour Review (published monthly) is probably of more general interest than any other International Labour Office publication. It is widely read by those engaged in industry in all countries.

BECAUSE it contains Special Articles by recognised Authorities on all problems connected with the treatment of Labour in Industry :

BECAUSE it summarises all important Reports and Enquiries on labour conditions in all countries, and thus makes their findings easily available in English :

BECAUSE its Statistical Section affords information on Wages, Unemployment, Cost of Living, Migration, etc., on an International basis which is nowhere else available :

BECAUSE its Bibliography is the most complete record of new Labour Laws and new Industrial Publications.

Price: 2s. 6d. or 60 cents per monthly Number. Yearly (post-free) £1 4s. 0d. or $6

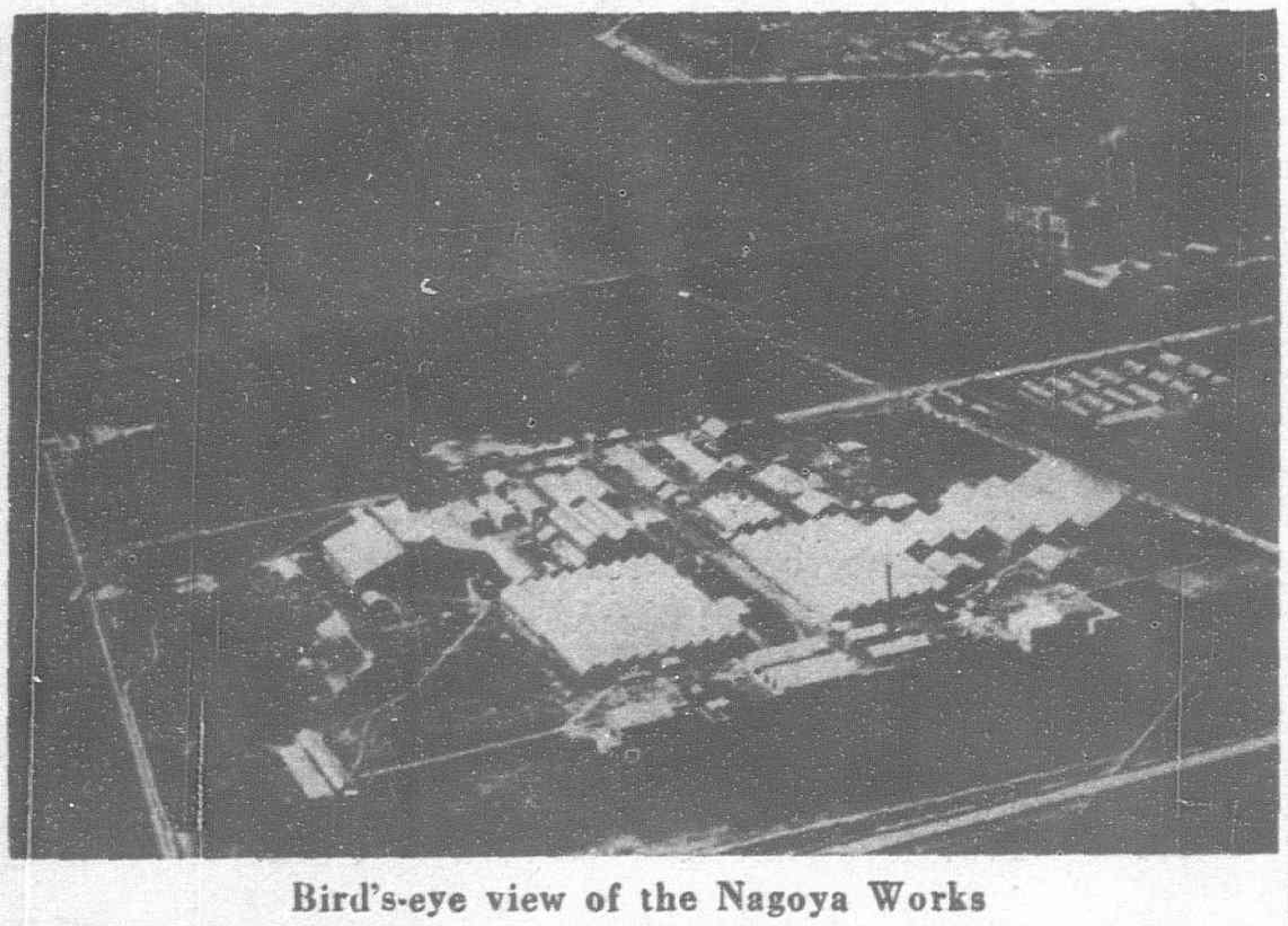
Published in the United Kingdom for the International Labour Office
by George Allen and Unwin, Ltd., London.

Obtainable with a free catalogue, from the International Labour Office (League of Nations), Geneva, Switzerland

INTERNATIONAL LABOUR OFFICE **GENEVA, SWITZERLAND**

MITSUBISHI AIRCRAFT CO., LTD.
(MITSUBISHI KOKUKI KABUSHIKI KAISHA)
Manufacturers of
Aircrafts, Aero-Engines, Aeronautical Arms, Automobiles, etc.

Head Office:—Marunouchi, Tokyo
Nagoya Works:—Oecho Minami-ku, Nagoya
Tokyo Works —Hinodecho Shiba-ku, Tokyo



Bird's-eye view of the Nagoya Works

Mitsubishi Mining Co., Ltd.

Producers and Sellers of Coal, Metals and other Minerals

Capital Y. 100,000,000

Head Office: MARUNOUCHI, TOKYO

Cable Address: "IWASAKIMIN TOKYO"

Products:

Coal, Coke, Gold, Silver, Electro. Copper, Electro. Tin, Electro. Lead, Tungsten, etc.

Branches and Representatives:

Tokyo, Yokohama, Nagasaki, Karatsu, Wakamatsu, Moji, Otaru, Muroran, Hakodate, and all the Branches of Mitsubishi Trading Co., Ltd.

BUILDING:

SHANGHAI'S PARAMOUNT INTEREST

Refer to the 1930 Edition of the

China Architects and Builders Compendium

The latest available technical and general data on all branches of building architecture and property are here presented in a clear, concise and practical, fashion. The phenomenal increase in all classes of building in Shanghai, combined with enhanced land values, makes an authoritative reference book of this nature indispensable, not only to contractors, builders and architects, but to property owners as well.

Price Mex. $5.00

ON SALE AT ALL BOOKSELLERS AND OF

THE NORTH-CHINA DAILY NEWS, SHANGHAI

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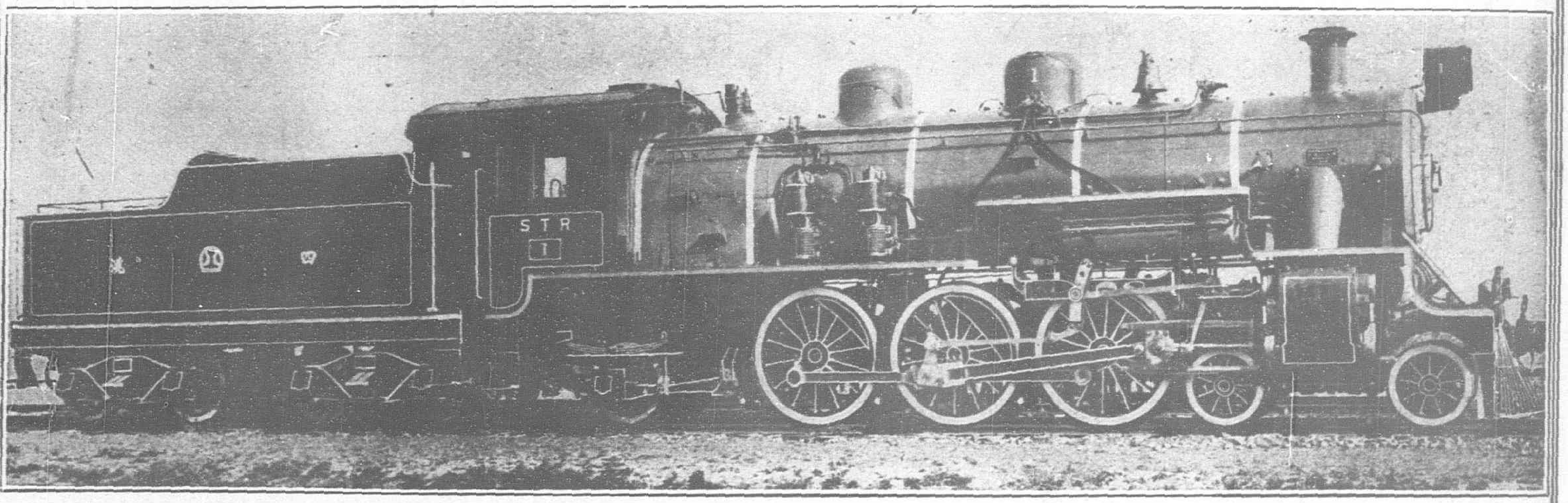

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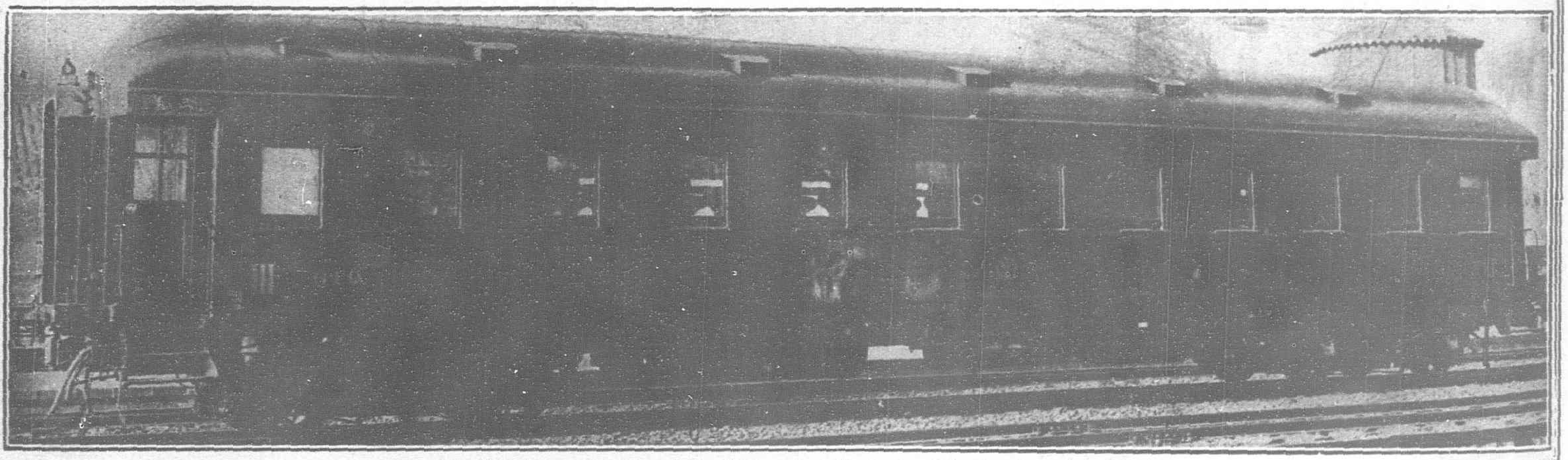

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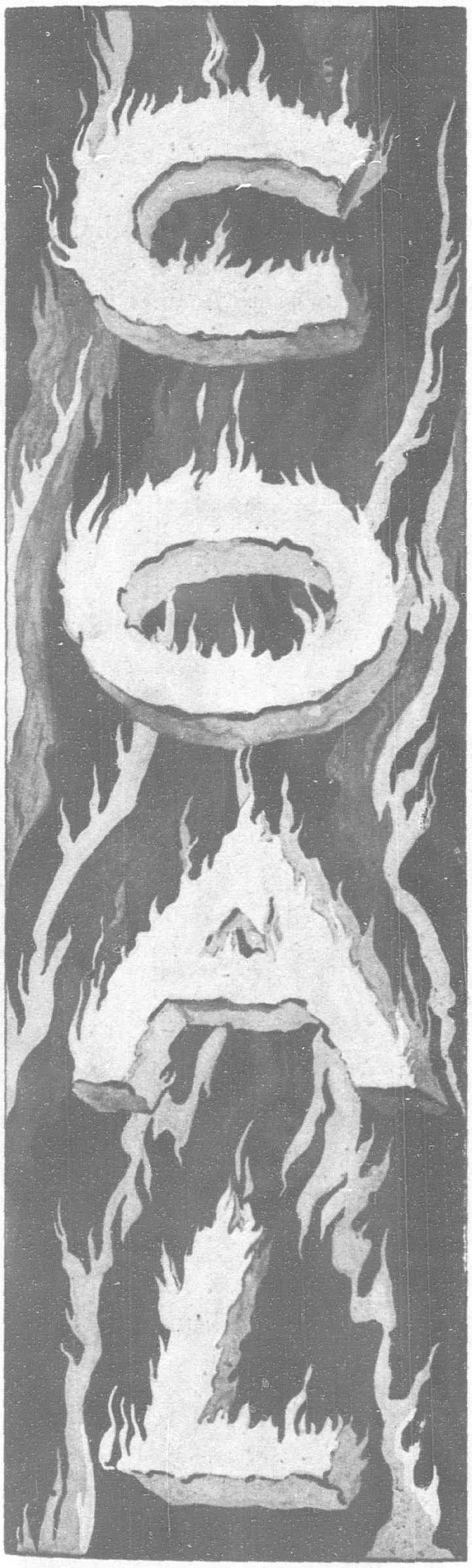

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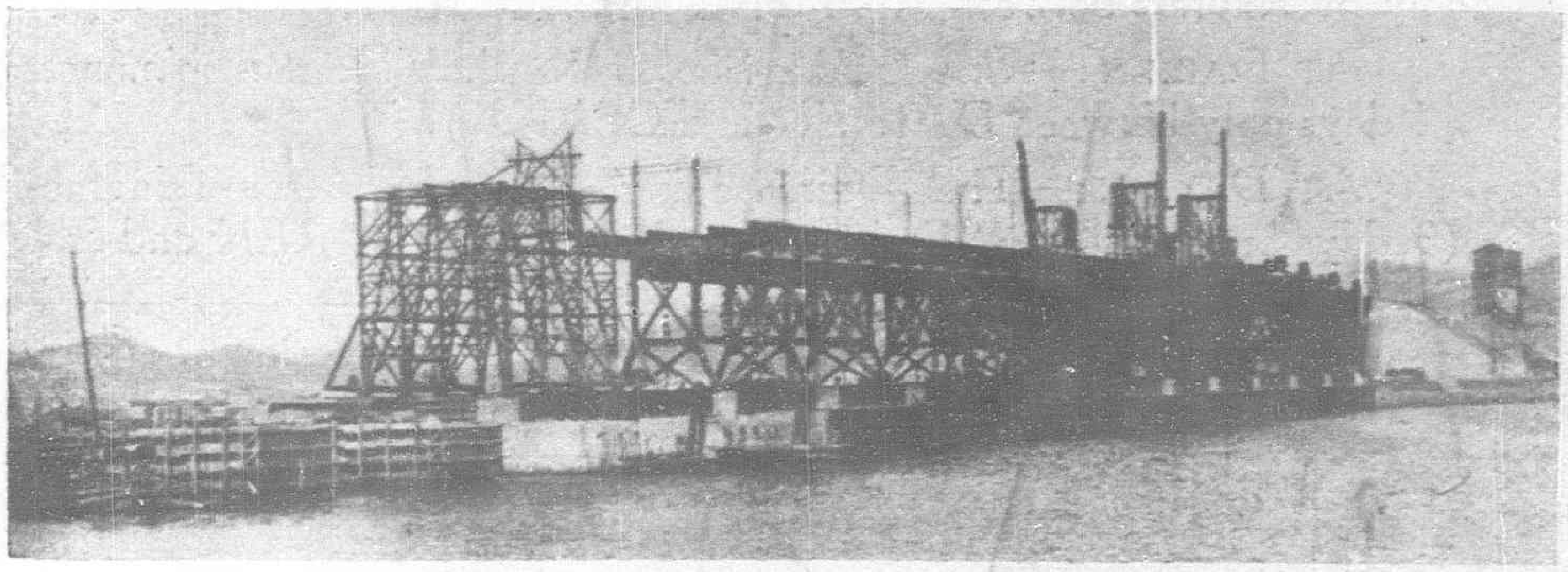

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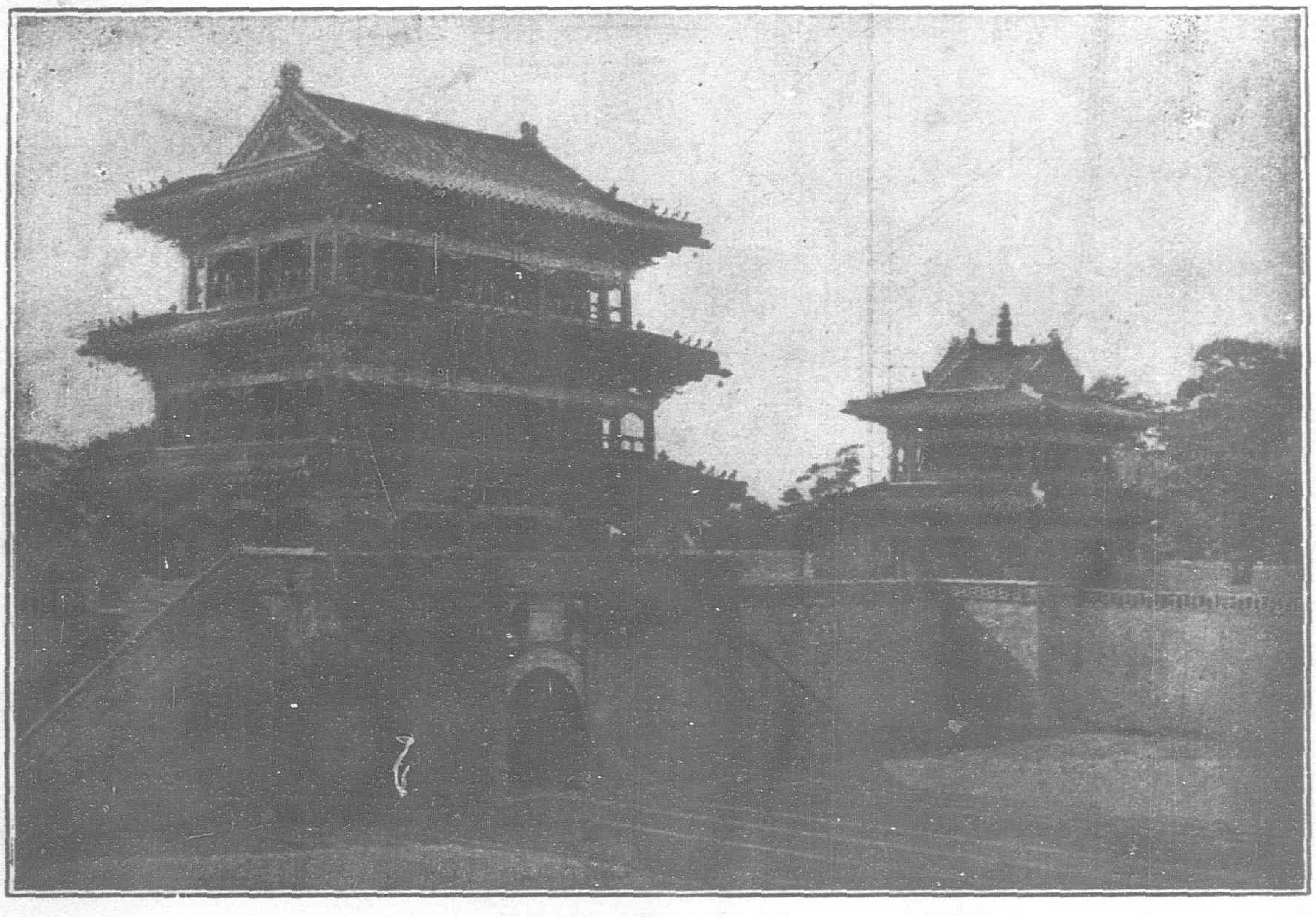

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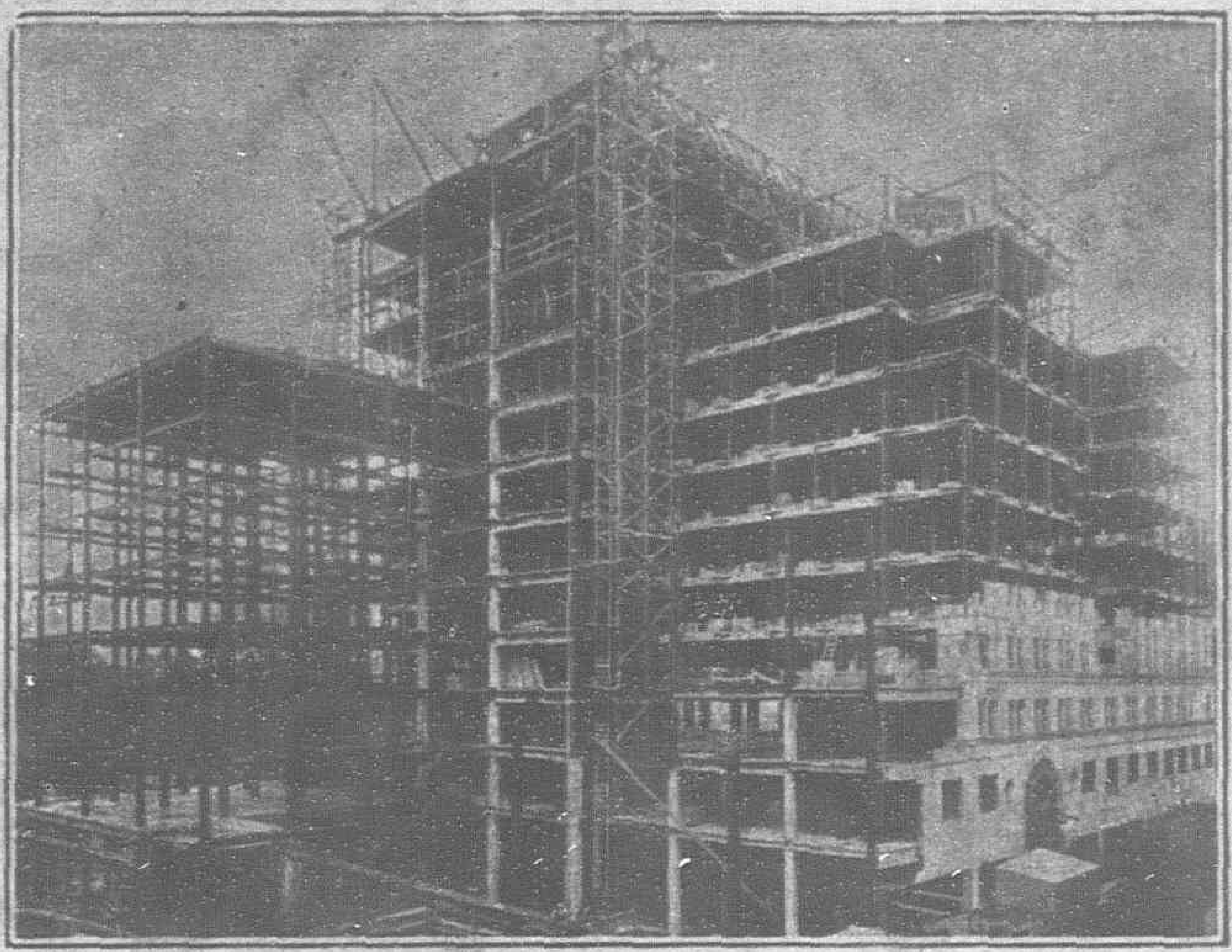

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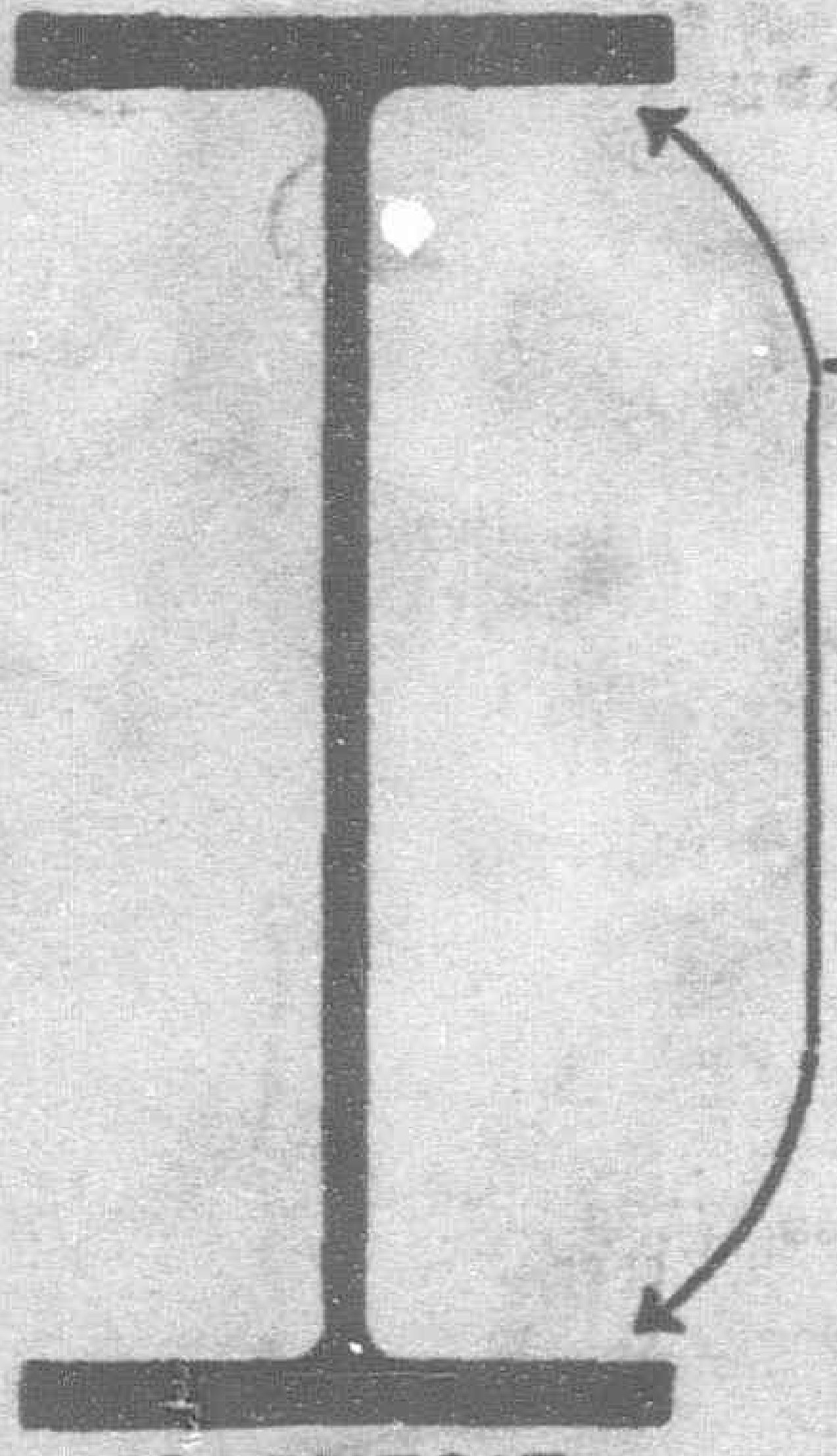

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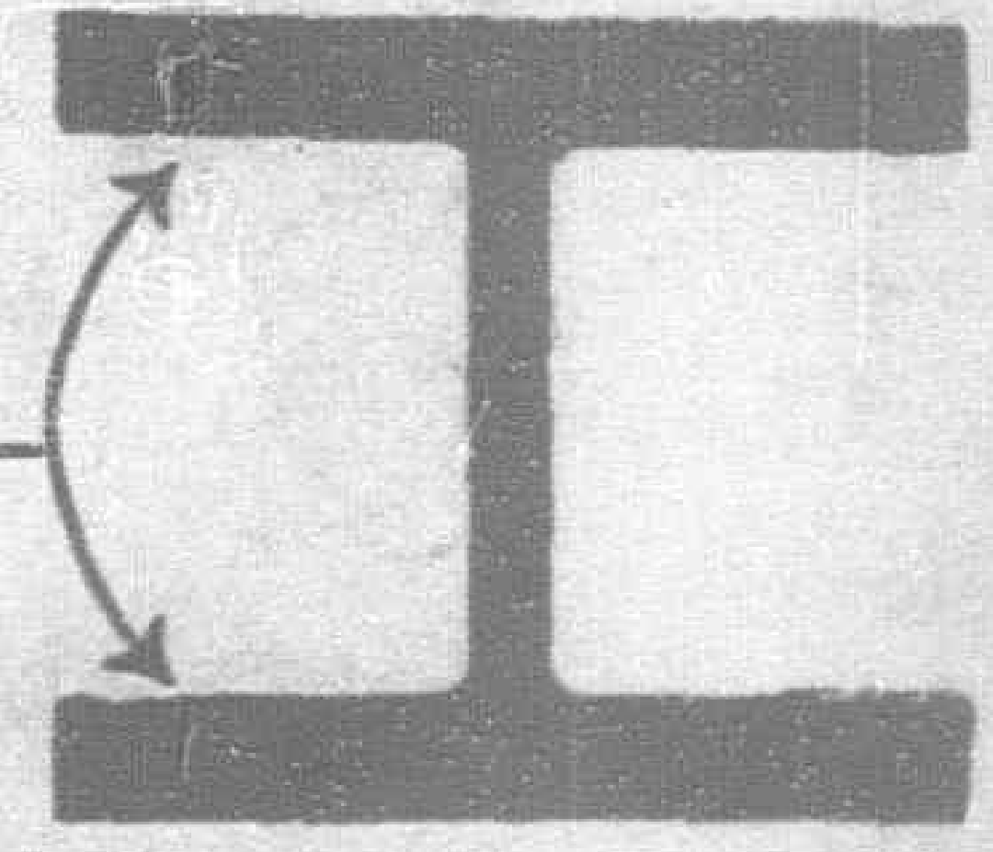

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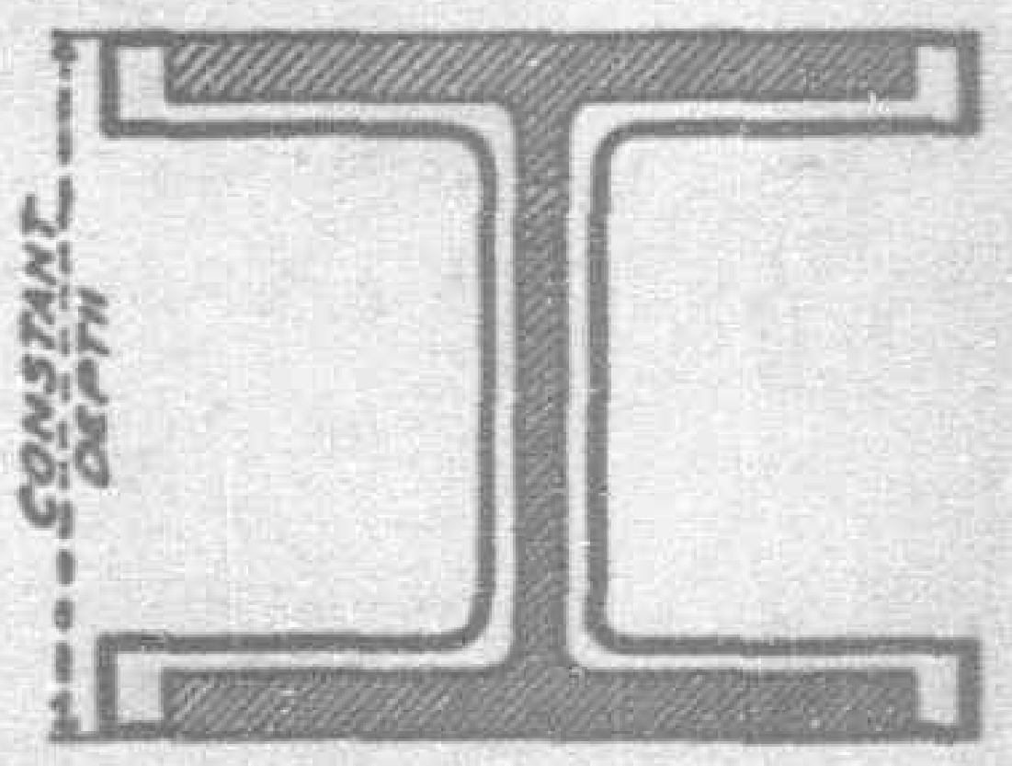

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The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XXVII SHANGHAI, JANUARY, 1931 No. 1

Railways First

The Salvation of China Must Come From Within

Some Thoughts on Industrialization and Further Investment of Foreign Capital

By GEO. BRONSON REA

How can foreign capital co-operate in the development of China, restore the purchasing power of her people and relieve the industrial depression in other countries? Will economic conditions in the leading manufacturing countries of the West (and Japan) be improved by pouring capital into China in order to create new industries? If the industrialization of China along modern lines is essential to the betterment of the world economic situation, will foreign capital flow into the country if the power of development and control is monopolized by the Chinese? Will China, after the abolition of extraterritoriality, extend to foreigners the same rights to trade and own property as are now enjoyed by Chinese resident in other countries?

The British investment in China stands at $1,750,000,000. Japan's stake is $1,400,000,000; America's, a little over $200,000,000. The combined foreign investments in China cannot be far short of four billion dollars gold. Will any further large amount of capital enter the country until the status of existing investments is clearly defined and assured? The present Chauvinistic tendency of the Chinese is to consider all foreign-owned industries as imperialistic infringements on their sovereignty, to be penalized, discriminated against and driven out, in order to protect their own enterprises from a competition they cannot overcome by legitimate methods. The British, French, Japanese and American Governments are apparently not so much concerned over prospective investments in China as they are in protecting their actual stake in the country. What will it profit these nations if they advance new capital for the development of industries under Chinese control, only to see it utilized to destroy their previous investments? These are a few of the questions that call for an answer before China can be assisted by further large scale financing from without.

Aside from the basic requisite of political stability, the problem of the reconstruction of China with foreign financial assistance reduces itself to whether or not foreigners will be conceded the same privileges that Chinese enjoy in other countries. If the Chinese enforce the doctrine that foreign capital will be permitted to enter the country only on the condition that control remains in Chinese hands, the development of its resources will be limited to semi-official enterprises in which the Chinese Government becomes the working partner and guarantees the investment. If the Chinese delude themselves that foreign capital will create industries only to have them legislated against and penalized by discriminatory taxation and railway freight charges in order to protect less efficiently managed native concerns, they are due for disappointment. Furthermore, if the Chinese labor under the impression that they may own or lease property, conduct business and pile up large fortunes under the protecting laws of other countries and then refuse the same privileges and opportunities to foreigners residing in their own country, they are also making a grave mistake.

The 1928 treaty between China and Belgium provides for the right of Belgian nationals to live and trade and to acquire property in any part of Chinese territory and by reason of the most favored nation treatment, this privilege will extend to all other treaty powers. Commenting on the failure of the National Government to protect China's sovereignty and independence, Mr. Tang Liang-li, in his "*Inner History of the Chinese Revolution*" scores Nanking for its surrender of vital Kuomintang principles and pointing to the Belgian treaty, says:

"This concession to Belgium is of the greatest importance, reversing an established practice in China several thousand years old. It is, however, without any counter concessions on the part of Belgium and in view of the peculiar economic conditions of the country, may in time reduce China to the status of an economic colony of the Great Powers; to a second Korea, Cuba or Nicaragua. It must be noted that in certain colonial possessions, notably in Java, for the purpose of safeguarding the interests of the economically backward natives, no one who is not a native, even if belonging to the governing race, is allowed to own land, except in a few specific cases.

"In this background it is clear that the mandate of the Nanking Government of December 28, 1929, declaring as from January 1, 1930, the abolition of extraterritoriality in China, has as little connection with the re-establishment of Chinese sovereignty as the 'war to end war' with the establishment of world peace and democracy. It is but another step in the direction of tightening the fetters of capitalist Imperialism on China. For extraterritoriality, except in Shanghai and one or two other Treaty Ports, has in practice become obsolete and non-existant; it is derogatory to Chinese national dignity and for this reason must be abolished, but actually it is of little practical value to the foreigner. It's formal abolition in the existing circumstances will automatically give the right of landownership to foreigners in China. The foreign capitalist, formerly restricted to the Treaty Ports, exploiting cheap Chinese labor, is now to be allowed to prey upon the peasantry in the interior also. The problem for New China is not the substitution of extraterritoriality by a new, and worse, form of bondage, but the simple and unconditional abolition of all restrictions in the life of the Chinese masses, while giving adequate protection to legitimate foreign interests. And to attain this objective the revision of the treaties concluded by the Nanking oligarchy in 1928-29 is a *sine qua non.*"

Mr. Tang speaks for the old Central Executive Committee of the Kuomintang headed by Mr. Wang Ching-wei, who for the moment is out of the political picture. Yet this picture may change. It will have to change if political stability is to be permanent in China. If this is the general attitude of the Left Wing of the Kuomintang Party toward what is really a reciprocal clause in the Belgian treaty, what assurance have other nations that they will be permitted to enjoy their treaty privileges unmolested?

If the colonial policy of the Dutch in Java and the United States in the Philippines is to be the guide for a sovereign state like China, demanding full equality of treatment in the family of nations, what advantage is gained by surrendering extraterritoriality (which at least permits foreigners to own property and establish industries in the Treaty Ports), if the right to own or lease property in the interior is denied to them ?

The Nationalist movement based on the program of the Kuomintang, owes it's final victory to the fact that for the past two or three decades the party has survived through the contributions of funds from wealthy over-seas Chinese, who have accumulated fortunes under the liberal and protecting laws of the countries of their adoption, notably Great Britain and the United States. These Chinese have peacefully penetrated the British, Dutch and American possessions in the South Seas and now control the retail trade of these countries and to an increasing extent, the export trade. In Malaya, Java, Siam and the Philippines, the Chinese have piled up huge fortunes in unfettered competition with the white and brown races.

In the United States, notwithstanding the exclusion law and certain state restrictions as to alien ownership of property, the Chinese have prospered and to-day practically monopolize certain lines of business. According to the Police reports of Greater New York City, the Chinese tongs, families and syndicates operate over 700 restaurants with an annual income of $75,000,000 (gold). Every American city has it's quota of these establishments and it is fair to estimate the total gross income from this business alone at $400,000,000, or more than double the value of the entire trade between China and the United States. This figure does not include other large scale activities which result in periodic warfare by competing tongs over a division of the spoils from the smuggling of opium, and from operating gambling joints. These figures reveal that the Chinese in the United States are doing a business under the protection of our laws and amassing fortunes which make the average American commercial firm in China look like a piker.

It is a foregone conclusion that in any revision of the Treaty between the United States and China, the chief stumbling block will be our exclusion policy and as the American Government will never surrender its right to control or exclude immigration, in order to preserve its dignity in any new treaty recognizing this principle, China will be compelled to apply the same restrictions. In fact, this is what China intends to do. Nanking will not object to the American exclusion law, as it intends to apply rigid regulations to control the entrance of all foreigners into China. Although the Kuomintang leaders are not advertising this feature of their policy, we are permitted to understand the Party's general attitude through the frank comments of Mr. Tang Liang-li. That this is the real program of Nanking was admitted in an unofficial conversation between a prominent Chinese diplomat and certain high American officials " The Chinese," he said, " do not want foreigners to reside and conduct business in their interior towns and cities, even after extraterrioriality is abolished. When the unequal treaties are revised and China's full sovereignty is restored, it is our intention to enact legislation that will prohibit alien ownership of lands and confine their residence to the old treaty ports and restricted areas in provincial capitals."

Now, the viewpoint of Nanking may have since changed, and if so, it will be disclosed at the proper moment in the treaty revision negotiations. If, however, any shake-up in the present personnel of the National Government takes place in the next year or two and the Chauvinists of the Left come into power, the program so frankly outlined by Mr. Tang Liang-li and reflected in the above conversation, will become the guiding principle in China's foreign relations.

If abolition of extraterritoriality does not carry with it the right of foreigners to reside in any town, city or village in China where they may see an opportunity to open a profitable business, and acquire property for that purpose ; if the privileges enjoyed by Chinese resident abroad are to be denied to foreigners in China ; what benefits will the latter derive from the new order of things, especially as the abolition of extraterritoriality means the ultimate surrender of the concessions and the application of Chinese law to these sanctuaries of foreign trade and residence ? Until there is a clearer understanding of what the future holds for foreigners to reside, trade, own and lease land, erect buildings and operate industries on a footing of equality with the Chinese, it is premature to discuss the immediate investment of any large amount of foreign capital in the country that is not guaranteed by the government.

Yet, some sort of relief through foreign financial assistance is imperative if Nanking is to develop those regions which acknowledge it's authority. If capital is to take a chance in China as conditions stand to-day, there must be at least a gambling chance of making a profit and not a " heads I win, tails you lose" proposition which hands it all over to the Chinese. Foreign capital may be willing to have another try at the wheel of China's fortune, even to risking a few thirty-six to one bets with a zero, double zero and ten per cent for the Bank. If, however, a Chinese croupier is to preside, spin the ball, rake in the bets and pay out the winnings in chips that cannot be cashed, no one will play the game. This sounds crude, but it is exactly what has happened in China during the last two decades. It is difficult to point to one single instance where Sino-foreign or Sino-Japanese enterprises established outside the Treaty Ports have been operated at a profit. Where administrative control has been exercised by Chinese, the result has been ruin. Where this control has been equally divided, the conflict of ideas and the Chinese insistence upon overloading the pay roll with relatives and friends, has reduced profits to the vanishing point. Unable to compete with more efficiently directed foreign enterprises located in the settlements, the Chinese are inciting labor difficulties, applying discriminatory taxation and railway tariffs in order to favor their own industries. The plight of the Japanese cotton mills in Tsingtao and Shanghai brought about by this unequal treatment, may result in forcing them out of business and if the taxes are not repealed, to sell out at any figure the Chinese may feel like paying. This is tantamount to confiscation.

The National Government has adopted a program that will bring all public utilities under its control. Railways, tramways, power plants, communications, water works, and several essential basic industries have been incorporated in this official monopoly. Under prevailing inefficient methods of administration, nepotism, inexpert technical guidance, labor despotism and other obstacles to profitable operation, governmental supervision or even a monopoly is perhaps the only way to facilitate the development of China's utilities and basic industries and from the viewpoint of the foreigner is the safest way to co-operate with the Chinese for a long time to come. On the other hand, if all the most attractive openings for the investment of capital are to be appropriated by the government, it leaves no play for individual initiative on the part of either Chinese or foreigners.

In Shanghai, we have two illustrations of the trend of this policy. The Shanghai Municipal Electricity Plant was acquired by an international group headed by the American and Foreign Power Company at a cost of $50,000,000 gold. Here is an instance where a highly efficient plant located at tide-water, could have been utilized as the central unit in a grand power scheme to serve the province of Kiangsu and hook up with Chekiang, but its usefulness must now be confined to the International Settlement by reason of the government monopoly created by Nanking and the intention of carrying out its own scheme of provincial power plants and systems. Similarly, the Shanghai Mutual Telephone Company, Ltd., recently sold its property and franchise to the International Telegraph and Telephone Company and Nanking officially declared that it will not recognize the validity of the transfer. Both these foreign corporations with their world-wide interests, are internationally recognized as the most advanced and efficient in their respective lines of activity. In both instances, the Chinese have an unusual opportunity of utilizing their superior technical experience and knowledge under some form of mutually profitable working agreement that will bring more lasting benefits to the country than any temporary financial advantage accrueing from an inadequately supervised government monopoly. This attitude towards any enterprise that may be arbitrarily classified as a public utility is in itself sufficient indication of the trend of Chinese policy. It will be difficult to interest foreign capital to take a chance in any Chinese development scheme until its status *vis-à-vis* the government is clearly defined. Foreign capital may co-operate as the preferred minority shareholder in an enterprise supervised and guaranteed by the government, but only in exceptional cases will it furnish the funds and hand over control of any company organized in co-operation with private Chinese capitalists.

Economic experts are now studying the problem of how China's purchasing power can be restored, but as yet there is no indication that their recommendations will favor further loans or capital for the creation of industries. Neither is it conceivable that new capital will take a chance in China until some agreement is reached as to the status of outstanding unsecured indebtedness and existing investments. It is natural that Chinese directly concerned with the material progress of the country should endeavor to influence foreign capital to co-operate in the creation of new industries under some form of agreement that concedes to them full control, but except in special cases, it is extremely improbable that this idea will meet with enthusiastic reception until the Chinese have established their ability to administer efficiently the funds of a public company.

Although the creation of new industries in China might ameliorate the present depressing conditions in certain areas, no real return to prosperity is possible without developing the agricultural and low grade products of the country. China, as yet, lacks the major essentials to embark on an industrial career under its own direction. There are however a few products now in general consumption that can be profitably manufactured in the country but in most lines of industry, it will be more profitable for China to import her requirements and concentrate her energies upon developing the natural resources that will bring the greatest good to the greatest number. What China needs more than anything else, is the development of her primary products and low grade commodities of which she has a greater potential wealth than any other country in the world. These can be utilized only if they can be transported to deep-water at a low cost which in turn calls for new railways, highways and an up-to-date transportation system. Once these natural products find an outlet, prosperity will follow. China can then pay for industrial development without seeking foreign loans or capital under conditions which at present are not favorable to either side.

The economic welfare of the United States for many decades was based upon agriculture. The export of grains and meat products brought prosperity to the farmers and to the country at large. America borrowed from Europe to build railways that would open up new territory and carry its low grade products cheaply to the market. Industry followed in the wake of transportation and gradually the nation built up its own industrial system enabling it to repay its indebtedness to Europe and become a financial and industrial power.

Dazzled by the wealth of the industrial nations of the West, the Chinese are dreaming of reaching the same level of prosperity and power by concentrating on the immediate development of modern industries. Relying on their enormous resources of cheap labor to win out in the competition, they overlook the greater benefits that will accrue to the nation by diverting this asset into the more essential channels of food production and those other raw materials derived from working the soil.

Even Soviet Russia in its grandiose Five Year Plan has placed agricultural development first in order to obtain the funds to finance industrial and transportation schemes. It has not taken long to convince the peasant land holders of the superiority of the "collective" or "corporation" system of farming where the work is done by tractors and machinery and the crop yield is fifty to sixty per cent higher. Two years ago, only two per cent of the peasant holdings were organized for collective farming. To-day nearly one half of all the peasant holdings have grouped their interests in order to avail themselves of the advantages of truck, tractor and mechanical farming equipment.

Although the individual holdings in China are much smaller, the same general conditions prevail as in Russia. If the Russians could be taught in a few years to adopt modern methods through collective or community farming, surely the same system could be applied in China, especially in the North where the land holdings are larger and the topography of the country lends itself to mechanical farming. According to Prof. O. E. Baker, there are about 700,000,000 acres of land in China available for the production of crops, of which, only 180,000,000 acres (roughly one quarter) are under cultivation and yielding about fifty per cent of the yield of similar crops in the United States. Even with rice, Western nations employing mechanical cultivation, produce from two to five times as much per acre as China. In effect, if China expands her available acreage and adopts scientific cultivation in order to increase the yield, these two advances alone will result in a greater national income per head, raise the general standard of living and increase the purchasing power of the people.

To plunge without preparation into huge Chinese controlled industrial schemes, would simply mean the sinking of millions of useful capital into enterprises whose profitable operation is at present possible only by erecting a high tariff wall and imposing discriminatory taxation on the more efficiently operated foreign-owned industries located in the Treaty Ports. The prosperity of China during what may be called a period of "industrial tutelage," can be assured only by concentrating upon the development of her natural resources through the extension and improvement of a national transportation system. Even without any considerable extension of present facilities, a few years of peace with the consolidation of control over the existing railways under one responsible head, will start a flow of agricultural and raw products from the interior to the seaboard that will double the purchasing power of the nation.

No real progress can be made in China unless the transportation system is developed either as a government monopoly or thrown open to private enterprise. The first step towards increasing the earning capacity and purchasing power of the nation as a whole, is the immediate consolidation of all the railways under the direction of the Ministry of Railways, *including those in Manchuria*. If the railways are to continue to serve the strategic needs of provincial rulers and their revenues appropriated for the upkeep of military establishments, there is no hope for China's industrial advancement or financial rehabilitation. The immediate release of the existing rolling stock for commercial purposes would permit the transport of immense quantities of produce now rotting in the station godowns and platforms and alleviate the prevailing depression. The railways of China, inadequate as they are to serve the traffic needs of the nation, are the backbone of its prosperity and no comprehensive development plan can hope to succeed until the lines and their revenues are brought under the full control of the Ministry of Railways and made absolutely independent of the other departments of the government. Unless the railways of China are made independent of the general budget and operated as in Japan in a watertight compartment, immune from other governmental interference, any scheme for the financial relief of China, for industrialization, for upholding and strengthening the Nanking Government, or for any other purpose whatever, will fail.

To talk of extending financial assistance to China, or to discuss seriously plans for the industrialization of the country, as long as the railways cannot perform their legitimate functions, is a waste of breath. If the railways were permitted to operate without military interference and all the revenues of the lines are paid in to the Ministry, prosperity would return to the country by leaps and bounds. The Ministry of Railways could then arrange to pay all its outstanding indebtedness for materials from it's own earnings without making this obligation a charge on the customs surplus; it could discharge faithfully on due dates all its loan obligations; maintain the present lines and equipment and enjoy a comfortable yearly surplus of at least $30,000,000, which could be used as security for new construction loans and to erect special industrial plants for the assembling of cars, locomotives, bridges and even a steel mill for the minor requirements of the railways.

On the reorganization and centralized control of the railways rests the whole economic future of China; the salvation of the nation from within. If the Chinese militarists refuse to lay the foundation of a lasting prosperity by retaining control over the existing transportation lines, it would be the height of folly on the part of outside investors to pour additional capital into a to country that will not help itself. The Chinese have the power to restore national prosperity without foreign financial assistance and it all comes back to the problem of railway control and guaranteed freedom from further military interference.

Minister Sun Fo recently stressed the importance of following his father's advice as to the development of China's industries by retaining the power in the hands of the Chinese, contending that this initiative could not be exercised without the abolition of extraterritoriality, which now concentrates all industrial activity in the foreign concessions and settlements, unreachable by Chinese laws. As pointed out editorially in the last issue of this magazine, his argument carries great weight, as under present conditions, Chinese capital will flow into the settlements and seek the protection of foreign laws, exemption from taxation and freedom from

Chinese legislation and regulations. As long as such conditions exist, the wealth of China, upon which the Government relies for developing the country, will be diverted into these foreign controlled and tax-exempted enterprises.

Nanking's main hope of interesting foreign or native capital in any field of industrial activity lies in creating official enterprises in which the Government becomes the majority shareholder and guarantees the investment and dividends, tending to create a government monopoly that will in the end kill all private initiative. And yet, this is the only way that foreign capital can safely cooperate with the Chinese until such time as they have mastered the fundamentals of public company organization, management and responsibility of directors to the shareholders. This concentration of the power of development must inevitably lead to the creation of a socialistic, if not a communistic state, in which all the principal activities of the nation will be monopolized or supervised by the Government.

Although Dr. Sun Yat-sen advocated that the power of development of the national resources should remain in Chinese hands, much water has run under the bridges since he wrote his study on the "*Industrial Development of China*" in 1921. Were he alive to-day, he would modify his viewpoint to meet changed conditions and welcome any equitable plan to develop China with outside capital, even to sacrificing immediate advantages for the ultimate welfare of the nation. Dr. Sun Yat-sen although intensely patriotic and nationalistic, looked a long way into the future and welcomed international financial assistance in any legitimate form that would develop and bring prosperity to the country and elevate the condition of the masses. He was willing that foreign capital should earn a legitimate profit from its investments in China under any form of concession or agreement that would ultimately hand the enterprise over to the government, either by purchase or on expiration of the franchise.

When President Yuan Shih-kai empowered him to organize the National Railway Corporation to finance, build, equip and operate all the railways of China, his original plan was to grant franchises to foreign capitalists for a specified term of years after which the enterprises were to revert to the Chinese Government. He was only swerved from his purpose by the fact that under extraterritoriality the granting of such franchises carried with it foreign jurisdiction over the properties and their personnel, with the certainty of military occupation in the event of internal disorders. Although he reluctantly abandoned his original ideas in favor of international loans for the construction of a state system of transportation, he remained firm in his belief that under a stable and powerful Chinese Government exercising complete sovereignty over all its affairs (that is, with the abolition of extraterritoriality) the granting of railway and public utility franchises to foreign or Sino-foreign companies was the best way to rapidly develop the transportation and industrial needs of his country. He was willing even as late as 1924, to contract with a Canadian corporation for the development of the Port of Canton, giving a blanket concession, with the port dues, warehouse and terminal charges over a long period of years as security for the cost of construction and a fair profit over working expenses.

This meant that Dr. Sun Yat-sen was not in favor of a strict state monopoly, preferring to permit private capital to develop railways and public utilities in the same way that similar undertakings in the United States have been brought to their present state of perfection under state or municipal franchises, providing for official supervision, regulation of tariffs, distribution of profits and ultimate reversion of the property to the people.

The National Government is perhaps unprepared or reluctant at this moment to adopt such a broad principle, but the time is not distant when extraterritoriality will cease in the interior and it must then face new conditions and shape its policy accordingly. The abolition of extraterritoriality must carry with it a greater freedom for the investment of foreign capital and establishment of industries, if the Chinese are to retain their privileges and equality of treatment in other countries. The end of the *unequal treaties* must be followed by reciprocal equality in these matters, if China is to progress. Under stable conditions, guarantees of law, order and justice, Nanking will be compelled to inaugurate a more liberal policy towards the development of the country and in due time revert to Dr. Sun's original ideas on this subject.

For many years to come, the Chinese Government will be called upon to carry out many huge construction and development schemes, taxing its credit to the limit to pay for them. Rapid railway development under the present system of governmental monopoly is possible only by a complete severance of the railway finances from the general budget in order that the surplus earnings of the lines can be set aside as security for new construction loans. The other revenues of the nation will be absorbed by the general budget and any surplus must serve for financing other equally important public works, education, judiciary, prisons, sanitation, river and harbor conservancy, improvement of the civil service, increase of salaries etc. The railways and revenue-producing public utilities must either finance themselves or be thrown open to private initiative as the only way to develop rapidly the all important basic needs of the country and hasten a return to prosperity.

If the present policy of state control is to be made permanent, the progress of new railway construction will keep pace with the slow restoration of the national credit, a process covering many years. The National Government at Nanking has never fully grasped the essentials of Dr. Sun Yat-sen's program for national development. His chief concern was to get the railways and other essential public utilities built and was willing to make any reasonable concession compatible with China's sovereignty and dignity to attain his end, realizing that the resultant prosperity of the territories opened up and served by these enterprises, would add to the nation's wealth and make possible the early redemption of the loans and the reversion of the franchises and properties to the state. Dr. Sun always had before him the example of the United States whose railways, largely built with foreign capital, laid the foundation of a national industrial system and created a prosperity which in time enabled the country to discharge it's obligations and acquire full possession of the properties.

The Menace to China's Security

Unification, Pacification and Sovereignty Imperilled by Lack of Centralized Railway Control

Two years ago, Mr. Sun Fo, the Nationalist Minister of Railways, drew up a modest scheme of new railways and invited American bankers to co-operate in their financing and construction. Most of the lines in the proposed net-work, were located south of the Yangtze River, where immediate construction is essential in order that the new government can consolidate its authority over regions where the spirit of unrest, lawlessness and revolt is endemic. The Manchus and their Peiyang military successors, obstinately refused to sanction railway construction south of the Yangtze that might enhance the political, commercial and strategic importance of Canton, concentrating their activities on new lines north of the River designed for their own pecuniary and military advantage.

When Dr. Sun Yat-sen, as President of the Chinese National Railway Corporation signed a preliminary contract with Pauling & Company of London to build the Canton-Chungking line, Yuan Shih-kai refused at first to admit its validity, but under pressure of the British Government finally consented on condition that the line be changed for one that would enable Peking to dominate the South and Southwest. The Canton-Chungking project was shelved and the contract rewritten to cover a line from Shasi to Singyifu. Peking's reluctance to provide proper railway communications for the southern provinces allowed the latter to raise the standard of revolt at will, proclaim and maintain their independence and ultimately to invade the Yangtze Valley and overthrow the Northern régime. Had Yuan or his successors constructed even a skeleton system of trunk railways linking the south and southwest with Hankow and the strategic center at Nanchang, the revolutionary movement could have been crushed in it's initial stages.

The capital of the National Government is now located at Nanking but the strategic picture remains unchanged. The regions south of the Yangtze are as revolutionary as ever, the rebels now adopting a communist façade, and unless the National Government can drive its transportation lines into all these southern provinces, it also, in due course, may be swept out of power by the same forces and combinations of circumstances that carried it to victory. Nanking's recent military successes in the North were made possible by the existence of railways leading into secessionist territory, facilitating the movement of troops and maintaining a line of communications and supply with the capital and deep-water base on the Yangtze. It will not be so feasible to repeat this campaign in the south and consolidate the central authority over provinces far removed from the seat of government. As the bandits and communists are driven out of the more densely inhabited centers and seek refuge in the mountains and remoter districts, the task of pacification will become increasingly difficult, settling down to guerrilla and bush-whacking tactics, that even the best fighting troops in the world cannot cope with successfully. It is an old axiom that "*you can't lick a man if he won't let you*" and the same rule holds good in China. In the mountain fastnesses of Fukien, Kwangtung, Kiangsi, Kwangsi, Hunan, Kweichow, Hupeh and Honan, these outlaw and communist bands will find a hiding place and at the first sign of weakness or a relaxation of vigilance on the part of the government forces, will reoccupy the populated centers. Only by a relentless pursuit can these bands be stamped out, a type of warfare the Chinese as yet have shown no inclination or capacity to engage in.

If it was banditry alone that Nanking had to fight, there might be some hope for an early enforcement of law and order, but behind the bandits are communist armies deriving moral and material support from a government that has never given up its program of bringing China under its influence and domination. Lacking railway transportation in the provinces south of the Yangtze, Nanking faces a long drawn out struggle to suppress a movement that at any given moment may again flare up into a nation-wide revolt against its authority. Granted that Chiang Kai-shek will ultimately succeed, it means that every city and town will have to be garrisoned, perpetuating the rule of petty militarists who will plot, intrigue, combine and even fight to hold their "tipans."

The situation in the South has its counterpart in the North, where the absence of strategic railways will eventually lose for China control over several of her most valuable outlying provinces and force a new delimitation of frontiers. The Far Eastern policy of Moscow, outlined in its Five Year Plan with its supplementary Fifteen Year transportation program, is emphasized by the recent collapse of Sino-Soviet negotiations. The conversion of the Trans-Siberian route into a supertrunk line with its feeders and branches terminating along the Mongolian frontiers, the many Central Asian regional lines to be connected with the main artery of traffic, the building of trunk highways, development of waterways and air-services, the erection of blast furnaces and steel mills, tractor and other industrial plants, the exploitation of perhaps the richest remaining gold producing deposits of the world, will give a fresh impetus to the forward policy of Russia in regions whose allegiance to Nanking or Mukden has almost disappeared before the realities of economic necessities.

Scoff as we may at the Soviet program, it will go through. Russia is becoming a land of metals, of automobiles and tractors. When we put the U.S.S.R. into a motor car and the mujik into a tractor, when Central Asia and Eastern Siberia are transformed into agricultural and industrial areas and for the first time in her history Russia establishes her strategic superiority East of the Urals, the frontiers from Manchuria to the Pamirs which now separate the Slav and the Mongol will be pushed back. All along these borders, Russia is marshalling her new strength, reaching out towards Promised Lands that beckon to her land-hungry millions. *The frontiers that separate Russia from China have yet to be delimited.* In twelve years the Soviet program of super-imperialism has brought within their sphere of influence, not only the whole of Central Asia, but the Urianhai region and the vast domain of Outer Mongolia. Karakhan, the Soviet Director for Foreign Affairs, boasts that he can amalgamate Mongolia with the U.S.S.R. at any time. As far as China is concerned, Urianhai (a territory of 176,000 square kilometers) belongs to the Soviet. The writer recalls his many intimate talks with Dr. Sun Yat-sen while revising his original 100,000 mile railway scheme, during which he at all times insisted upon retaining as a vital part of his plan, the Trans-Mongolian Trunk Line with a branch reaching into Urianhai, which region he declared, was the richest part of Outer Mongolia, absolutely essential as a mineral reserve for the future industrialization of his country. Dr. Sun knew enough of the limited mineral resources of China Proper to understand how inadequate they were to carry out his plans for national reconstruction and forsaw that China would have to seek it's basic minerals in the Altai or Himalayan regions. Many of his railway projects which seemed like dreams had similar good reasons to justify his tracing them on the map. Urianhai has slipped away, gravitating politically towards its only physical outlet, as will also the rest of the highly mineralized Altai Region, the rich agricultural Ili Valley, Zungaria, and Chinese Turkestan. The main stream of traffic into and out of these borderlands is through Siberia and nothing that China can now do will change this natural flow with its inevitable political consequences. At Urumchi, Kashgar, Kuldja, Kobdo and Chuguchak are Russian consulates, with their guards, banks, paper currency, and all the strings of trade in their hands, ready to take advantage of any movement that will eliminate Chinese rule in these regions.

We are witnessing in China Proper the results of the impact of Western mechanical forces on the older civilization of Cathay, where the conflicting policies and jealousies of the Powers, together with the trend towards the pacific adjustment of international disputes, is permitting the Chinese to have their own way in world diplomacy. Nanking is taking full advantage of these Peace, Arbitration and Disarmament Pacts, World Court and League of Nations to talk the Powers into surrendering their Treaty rights. As the West renounces the use of military force to support its diplomacy, China emerges from her isolation as the chief exponent of the new art of warfare, coercing her political opponents at the point of a boycott bayonet. In a war of words, emotional nationalism, pacifist drivel and diplomatic shilly-shallying, China will enforce her viewpoint upon those nations whose sole interest in the country is confined to legitimate trade.

It is only when China faces Russia that she finds an opponent that can talk as loud and as long, and who cannot be intimidated by boycott threats or appeals to sentiment. Along her land frontiers, China confronts the reality of a formidable, relentless Slav expansion, before which her petty squabbles with the other Powers over trade, extrality and concessions pale into insignificance. China can bluster her way through with the pacifist-minded nations of the West, who can reach her only by water, but is meekness personified when it comes to an issue with her formidable land neighbor on the North and West.

Here on the plains of Central Asia, we are witnessing the prelude to the great conflict of the 20th century, a play of primal forces for the right to exist, such as the world has never before witnessed. For the present, Russia may condescend to discuss these problems in order to gain time until her Five Year Program is completed. There is no hurry as far as Moscow is concerned. Nothing can change the situation ; no single Power or combination of Powers can oust her from her already dominant position. China may tell the world her troubles, but there exists in Moscow a group of men who will never forget or forgive. The Nationalists conquered and imposed their rule over the country with Soviet assistance and direction, then kicked them out, massacred their agents and followers and went over to the Capitalist camp. Right or wrong does not enter into the picture. Moscow believes itself in the right and will never rest until it has liquidated the account. So, in addition to the irresistible *Drang nach Osten* of Russia, the ages-old urge of a land-hungry people, there enters the element of revenge, a determination to humble a government that after accepting its help and guidance to elevate itself into power, has broken off relations and challenged it on issues that can be permanently settled only by an appeal to arms.

It is necessary to stress these basic conditions in order to understand better how the lack of railway facilities at this crisis in the history of the country, will retard the pacification of the South and hasten disintegration in the North and North West. As far as the South is concerned, there is hope that a vigorous military campaign will ultimately consolidate the Central authority in these regions. Nanking is fortunate at this moment in having arranged for the expenditure of the remitted British Boxer Indemnity Funds for pushing to completion the gap in the Canton-Hankow Railway, the backbone of China's transportation system. This line, however, passes through strongholds of communism and banditry and is open to attack by the formidable Kwangsi militarists. If Nanking is to survive, this line must be built as rapidly as possible, protected during construction by strong military detachments and efficiently guarded when completed. If funds could also be made available from the same sources to build the Nanking-Nanchang-Changsha line with a connection to Hangchow, another line from Nanchang to Foochow, and a line from Nanchang up the Kan River Valley, this skeleton system would enable Nanking effectively to control the Southeast. From Nanchang, the strategic center of military power south of the Yangtze, other essential lines could be built that would enable the government to solidify its authority in these provinces and push back the forces of disorder to regions west of the Canton-Hankow line where they will not seriously menace the ports or centers of industry and commerce. The gradual pacification of China, extension and consolidation of central authority must now follow a program of conquest by railway, a local application of the same methods employed by Russia in extending her sway over Central Asia, or the same process by which the American Far West was reclaimed and settled. There was a time when the rising tide of Nationalism might have united these provinces under one government, but Nanking to-day is in exactly the same position as was Peking, compelled to wage unceasing warfare to maintain it's authority in regions where the absence of rail transportation hampers pacification and favors the spread of revolt.

It would seem that the menace of Russia alone would be sufficient to influence Nanking and Mukden to sink their differences and come together for mutual defense, but the Manchurian warlords are making impossible the formulation of any plan for national defense by refusing to incorporate their railways into the national system directed by the Ministry of Railways and by developing a deep-water terminus within their own territory that conflicts with the program of Nanking for the creation of one great Northern Port near Taku. In these moves, Mukden proclaims it's real position *vis-à-vis* Nanking, retaining its absolute independence in everything that affects its own regional welfare and revenues. Under such conditions, the Central Government can never lay down or carry out any scheme of national defense by railways in the outlying provinces.

It is necessary to invite attention to this phase of the situation in China in order to emphasize the urgent coming together of North and South in a common policy and program in regard to vital railway construction. In order to assert and consolidate its authority in the South, Nanking must direct all its energies on building the essential military lines radiating from Nanchang. If the territorial integrity of China is to be safeguarded, Dr. Sun Yat-sen's scheme for the construction of strategic and colonization lines in Mongolia must be carried out while there is yet time. The Soviet railway program for 1931, includes the double-tracking and improvement of the Trans-Siberian Railway between the Urals and Novosibirisk. Its completion will synchronize with that of the million-ton Kutnetz Steel Mill in the Altai region. In less than two years, Soviet Russia's superior strategic position in Central Asia will be assured and it will then be too late for China to save her border provinces and the Barga Region from following the lead of Outer Mongolia.

China's very existence is at stake. The handwriting is clear upon the wall. Unless Nanking and Mukden come together quickly in real unity and with a common program for the defense of the nation as laid down by Dr. Sun Yat-sen, there may be no Chinese nation in five years.

The Manchurian authorities, concerned with their own affairs, are seemingly determined to build their own transportation system without reference to Nanking or the strategic needs of the nation. The Northeastern Railway Commission which functions as the Ministry of Railways of the three Manchurian provinces has drawn up a very comprehensive construction program, which includes lines parallelling, crossing and recrossing the South Manchuria and the Chinese Eastern Railways, creating alarm in both Tokyo and Moscow. It would seem that Mukden is trying to ascertain just how far it can carry its bluff without being called, relying on the Kellogg-Briand Pact to escape an open conflict. The Mukden Government tried it out the year before last, after the Soviet had meekly swallowed several previous indignities and found out just where Moscow stood on the Chinese Eastern question. After being flattened out by the Soviet road-roller and before this issue is settled, the same group starts to monkey with the Japanese buzz-saw. It is not necessary at this point to itemize the fifty odd lines projected by the Manchurian authorities, but the mere fact that such a program has been made public is evidence that the Chinese, taking advantage of Japan's reluctance to enforce compliance with old agreements, are determined to destroy her vital economic interests in Manchuria by slow strangulation. For the past decade, successive Japanese cabinets have split on their China policy and in this conflict of ideas the Minseito has gradually imposed its viewpoint. Baron Shidehara has endeavored to overcome China's mistrust and ill-will by a program of conciliation, concession and sympathetic tolerance in the face of constant proofs and demonstrations of a deep-rooted organic hostility that goes as far as teaching the rising generation to look upon Japan as the National enemy. China has taken full advantage of Japan's economic distress. Pinning faith in the Kellogg-Briand Pact and the jealousies of the Powers to intervene in any show-down, Nanking is pursuing a policy directed against Japanese interests in China that can end only in their complete elimination. Here we have a striking illustration of how renunciation of war as an instrument for the settlement of international disputes enables the weaker country to flout its obligations, impose its will upon the stronger, imperil the latter's economic existence and emerge victorious from the conflict.

The Chinese in Manchuria, like their compatriots in Nanking have been carried away with dreams of huge industrial, railway and development schemes, believing that foreign investors are only waiting for the invitation to pour capital into the country under conditions which give to the Chinese full control. As far as railways are concerned, this craze has resulted in over 60 lines being designed for the Manchurian provinces, emanating from all sorts of minds, some serious, some official and some mere pipe dreams. There are a sufficient number of these projected lines, however, which impair the value of the South Manchuria Railway and cause the Japanese uneasiness. In view of the recurrent anti-Japanese agitations, boycotts and trade disturbances in China during the last decade and the declared policy of the Chinese Government to refuse to recognize the validity of the 1915 Treaty confirming Japan's rights to the South Manchuria Railway and the Liaotung Lease, it is not surprising that public opinion in Japan is apprehensive over these developments.

All this comes at the very time when there are indications of a better feeling between China and Japan as the result of the negotiations between the Japanese Minister and Nanking, where most of the outstanding questions are being discussed with a view to giving satisfaction to either nation. The agitation and propaganda connected with these Manchurian railway schemes emphasizes the fact that no matter how Nanking may endeavor to compound its differences with Japan, there exists a die-hard group that will never let the fires of hatred grow cold.

There is always something new to create difficulties. A few months ago, it was reported that Nanking officially demanded the discontinuance of the Fushun Shale Oil Plant as being in contravention of the agreement which provided solely for the mining of coal. It is now reported that Nanking has drawn up a plan to deprive the Japanese of their rights to the Fushun Coal Mines, based on the stipulations of the original agreement. It is no wonder that the Japanese people are alarmed over reports which they have every reason to believe faithfully reflect the general Chinese attitude towards their rights in Manchuria. When considered in conjunction with the tendency to ruin their cotton mill investments by the imposition of discriminatory taxes and freight rates; with the opposition to the South Manchuria Railway negotiating a loan in America for the improvement of the line; the refusal to sanction the extension of the Kirin-Tunhwa line to the Korean frontier and other significant acts of animosity, they are fully justified in growing uneasy over the future.

Responsible Japanese officials are endeavoring to allay these fears by minimizing the importance of the agitation for new railways in Manchuria, assuring their people that when it comes to a show-down, the Government will stand firm against any flagrant violation of the agreements. After all, they point out that with all the fuss and talk, the only new Chinese railway construction in Manchuria during 1930, was the 25 kilometer extension on the Tsitsihar-Koshan line.

It is significant however that the Japanese Government has permitted Mr. E. Kimura, head of the Asiatic Bureau of the Foreign Office in Tokyo, to resign from the diplomatic service to take over the important post vacated by Mr. Y. Matsuoka on the directorate of the South Manchuria Railway in order to attend to the political affairs of this semi-official company. The mere presence of Mr. Kimura in Dairen is an indication that Tokyo is keeping an extra close watch over Manchurian developments.

Public opinion in Japan is extremely sensitive regarding Manchurian and Mongolian questions and no government could remain long in power which failed to defend the vital national interests in these territories. The attitude of Baron Shidehara during all this hectoring and bully-ragging, continues to be one of friendly interest, recognizing that the Chinese have the right to make plans for the development of Manchuria without consulting Japan, which can only watch how far these plans may conflict with existing agreements. Japan's policy towards Manchuria is unchangeable and as long as there is no immediate menace to the South Manchuria Railway by the construction of actual parallel lines, Japan will welcome and assist the Chinese to cover Manchuria with a net-work of new railways, including even those which divert traffic to the port of Hulutao. Planning, discussing and even surveying new railways in Manchuria is one thing ; building these lines is quite a different matter. The Japanese take the attitude that the Chinese cannot completely isolate the S.M.R. or destroy the commercial importance of Dairen by building new railways or harbors. Hulutao is the only ice-free harbor that can serve the needs of Western and Southwestern Manchuria and it will take years to develop it into a port capable of handling even two to three million tons of cargo. By the time it is completed with wharves, godowns, railway terminals and all the mechanical equipment for handling this tonnage, the increase in the productivity of the hinterland will call for a dozen similar ports to take care of the traffic. There is only one Hulutao in Manchuria. The other deep-water outlets are through Dairen, the Korean port of Seishin or Vladivostok. Sooner or later, the Chinese must recognize the realities of this situation and consent to the extension of the Kirin-Tunhwa line to the Korean border or the development of Manchuria will come to a stand still.

It is again necessary to pause and get a proper perspective of this picture. The feverish activities of Russia in Central Asia and Siberia to support her forward policy is obvious. Within two years, Irkutsk will become the strategic base of operations of the Soviet forces in the Far East, connected by a double-track line to the Urals and with two steel Mills having a yearly output of three and a half million tons. The port of Vladivostok is to be enlarged and improved at a cost of Roubles 17,000,000 in order to enhance its working efficiency and to absorb the produce of North Manchuria now being attracted to Dairen and Hulutao. The Ussuri Railway is being reorganized and re-equipped under the direction of Japanese railway experts to take its place in the general scheme and handle its share of the traffic from Northern Manchuria. After completing their work on the Ussuri lines, the engineers will proceed with the Amur line.

The recent collapse of the Sino-Soviet negotiations over the C.E.R. will be followed by a stronger policy on the part of Moscow in regard to Chinese railway construction in North Manchuria. The Soviet will oppose the construction of all new lines which tend to deprive the C.E.R. of traffic and the issue that Japan has refrained from precipitating over violations of railway agreements in South Manchuria will be forced by the Soviet to protect their interests in the North. The whole scheme of Soviet development in Siberia will collapse without full control over the C.E.R. as the most economical outlet for the Trans-Siberian super-trunk system.

In this connection, it is interesting to note that Soviet Russia has already set in motion her program for the commercial conquest of Manchuria, dumping the products of her communistic factories in Harbin at prices which defy competition. In the main, these articles are of a superior grade, equal to if not better than similar goods manufactured in other countries. In certain lines, the Soviet has already become a dangerous rival to established foreign merchants. There is reason to believe that the Soviet is now trying to accomplish industrially and economically what it failed to do politically in China, driving out the foreigner by depriving him of his trade ; his sole object for being here. That Manchuria should be the first point of attack is only natural, as here the Soviet controls its own transportation lines and can lower the freight rates and grant concessions that will enable her co-operatively produced goods to reach the market cheaper than her competitors. This situation is being watched with great concern by the traders of all nations established in Manchuria.

Soviet prestige and trade position in Manchuria is stronger than ever and curiously enough the Chinese seem to accept their defeat without holding any rancor. The Soviet emerged from the recent conflict as the moral and material victor and is standing squarely on the terms of the Habarovsk Protocol as the only basis of settlement. Moscow will now insist upon a greater measure of extraterritorial rights in the C.E.R. Zone (principally in Harbin) than the nationals of other countries enjoying these privileges. Chinese police persecution of Russians in Harbin is a thing of the past.

Soviet Agents who were most active in destroying property, blowing up bridges and assaulting Chinese officials during the recent unpleasantness, are all walking the streets of Harbin, some of them even holding higher positions than before the trouble started. What is also significant is the fact that the C.E.R. workers are all armed and can be mobilized at a moment's notice. The Soviet can put under arms 15,000 fully equipped men inside Chinese territory within two days, a force sufficiently strong to hold the strategic points until the main Soviet army can send reinforcements across the border.

The Chinese are making no noise over this situation, in fact they seem willing to accede to any and all Soviet demands for the purpose of maintaining peace in the Railway Zone. This peace group is headed by Chang Tso-hsiang the Tuchun of Kirin, the uncle of the Young Marshal, and the real ruler of Manchuria. He is the sole owner of the Mulin Coal Mines and it was he who insisted that the Habarovsk Protocol be speedily accepted and signed in order to save his private property from being destroyed by the Soviet troops in the same way they treated the Jalainor mines. Nanking, for the sake of appearances, may have charge of the negotiations with Moscow over the C.E.R. question, but the real boss of the Chinese envoy is the quiet, but very efficient militarist of the old school, who rules the roost at Kirin and Mukden.

Turning to South Manchuria, we see the Chinese actively engaged in devising schemes for the slow strangulation of the S.M.R. and Japanese industrial investments. Thousands of miles of new railways are being projected for an immense territory whose only outlet under Chinese jurisdiction is a third-rate artificial port still in the making. The Chinese have no money nor the security on which to raise money to carry out these huge projects. Even the Hulutao contract, was made possible by violating the terms of a former loan agreement and is being carried forward over the protests of the British Government. The Manchurian authorities have scoured the world seeking financial assistance to carry through their railway schemes. Turned down by American financiers, they interested the Germans and are now endeavoring to persuade the British to advance funds. As long as the Hulutao contract is based on the diversion of funds set aside for the security of a British loan, it is hardly conceivable that the British Government will countenance a loan to Mukden for any purpose whatsoever.

Notwithstanding these rebuffs, Mukden refuses to admit its financial dependence upon the recognized government at Nanking in these matters and is constantly wasting its time in fruitless efforts to accomplish the impossible. Mukden can give no security worth the paper it is written on, unless it bears the guarantee of the Central Government and this will not be forthcoming unless the Central Authorities have full control over the expenditure of the funds and the operation of the lines.

American financiers would have gladly loaned the funds to the South Manchuria Railway Company for improvements and extensions, but the Chinese protested so vigorously, attacking the validity of the 1915 Treaty, that no funds can now be procured in America for Manchurian development until this opposition is withdrawn. If these feeder lines to the S.M.R. cannot be built by Japan with the assistance of American capital, it is hopeless to expect that Americans will now build them for the Chinese who are in no position to guarantee the loans or provide protection to the properties.

The Chinese authorities in both Mukden and Nanking have placed on record their emphatic refusal to recognize the legality of the 1915 Treaty which closes the door to any direct loan to the S.M.R. and throws the burden of financing all new lines in Manchuria upon the Chinese themselves. The Chinese have therefore created a deadlock, making impossible the flow of foreign capital into Manchuria through the Japanese and by reason of their own instability, disunion, financial bankruptcy and lack of guarantees, any assistance for themselves. Yet the Chinese proceed with their grandiose plans with no thought of what it all portends. They are up against a stone wall and don't know it. Meanwhile, until they come to their senses, Manchuria will stagnate while Soviet Russia pushes to completion her plans for the ultimate domination of Eastern Asia.

Japan is placed in a delicate and perplexing position, forced to watch the gradual unfolding of a situation that is undermining her vital strategic and economic interests. The outside Powers by committing Japan to co-operate for the protection and advancement of their own special interests in China have created a situation which sooner or later must terminate in a show-down. We are repeating the mistake of 1898, when John Hay in blissful ignorance of the existence of a secret treaty of alliance between China and Russia, promulgated his Open Door Doctrine which Japan subscribed to unreservedly, binding herself to respect the territorial integrity and sovereignty of China at the precise time when the latter was handing over its Manchurian Provinces in order that Russia might place herself in a superior strategic position to annihilate Japan! There is little difference between the situation of 1898 and 1930. Japan's hands are tied by the jealousies of the other Great Powers and the many Treaties which preclude independent action to protect her own interests. No other Great Power would accept similar restrictions on its liberty of action in spheres where its own vital strategic and economic interests are at stake. Japan is therefore playing the game under great difficulties and provocation. There is only one way out of this *impasse* so that China and Japan can work together and face their future in Manchuria with some feeling of security. No foreign capital will enter Manchuria on the guarantee of the Mukden Government even if sanctioned and super-guaranteed by Nanking. The risks are too great. Foreign capital, however, will co-operate with the S.M.R. which carries with it the guarantee of the Japanese Government not only as to principal and interest but to protection against lawlessness. If China is to place herself in a position to preserve her authority over Mongolia, the Barga Region and other outlying provinces, she can do so now only through an understanding with Japan in which the South Manchuria Railway Company will be permitted to raise loans for Manchurian railway extensions. These new lines can enjoy the same status as the other Japanese financed and constructed lines of the Chinese Government. The first step in such a program should be the immediate extension of the Kirin-Tunhwa line to the Korean border linking up with the Korean Government Line and a deepwater outlet at Seishin. This will provide Eastern Manchuria with a port competing with Vladivostok under the protection of the Japanese navy.

A careful analysis of China's problems based on the above conditions leads to the following conclusions:

1. No scheme of national financial rehabilitation, industrial, or railway development can succeed unless based on the immediate unification of all railways under the Ministry of Railways, and a central control over operation and revenues. The Railway finances should be made independent of the general budget, and the surplus earnings set aside as security for financing further extensions.

2. The British Boxer Indemnity, in addition to being employed to complete the Canton-Hankow line, should also be used to build the Nanking-Nanchang-Changsha line, the Nanchang-Foochow, or the line from Nanchang up the Kan River Valley to Kanchow and thence to Swatow or Shiuchow. This skeleton system is absolutely necessary if Nanking is to consolidate its authority in Southeast China.

3. Either Mukden must surrender full control of all the North and Northeast railways to the Central Government in order that Dr. Sun Yat-sen's scheme for the national defense can be carried out and loans raised for this purpose by the Ministry of Railways, or the essential new lines in Manchuria must be built for the Chinese Government by the S.M.R.

With strict economy, the £8,000,000 proceeds from the remitted British Boxer Indemnity should build nearly 1,000 miles of new railways in Southeast China. The rehabilitation of the other lines could be taken care of from the general revenues of the Ministry. The South Manchuria Railway Company could float an immediate foreign loan of fifty to a hundred million dollars for new Chinese Government railway extensions in Manchuria constructed under their direction and operated under the same terms as the Kirin-Changchun and other similar lines in Manchuria.

G.B.R.

Headed for Prosperity

THE most important and welcome piece of news that has come from Nanking since the establishment of the present government, is the announcement of Mr. Sun Fo, Minister of Railways, on January 21, to the effect that with the exception of over one hundred cars still being detained by the troops under Shih Yu-san, all the rolling stock commandeered by various military units have been returned to the Ministry.

Those still detained are also expected to be returned within this month.

Minister Sun Fo said that in order to improve communications, the Ministry was arranging to purchase 100 locomotives, several hundred passenger coaches, and more than 1,000 freight cars for use on the various Railways.

Half of the funds needed will be appropriated from the Boxer Indemnity Refunds; the remainder to be financed by the banks.

China's salvation from within is now possible and it only remains for the Young Marshal and his group of Manchurian War Lords to fall into line and hand over the control of their railways to the Central Government, so the whole system can be operated as one unit and the revenues used for meeting the outstanding debts of the railways and as security for loans for new construction. The unification of China, the consolidation of authority, the stabilization of finance and a return to real peace and prosperity will never be fully realized until the Manchurian railways are operated as part of the State system.

That Silver Loan

THERE may be excellent reasons why a huge silver loan to China seems desirable to American silver producers and to certain high officials of the Chinese Government, but *The Far Eastern Review* cannot subscribe to any proposition that shoulders the burden of financing China upon the American Government.

There is a Minister of Finance in the National Government of China responsible for the finances of the nation who has opposed such a loan. This, in itself should be sufficient to call an immediate halt to any further discussion of the subject. If the legislative and legal branches of the National Government are to carry on a propaganda for the negotiation of such financial assistance over the protest of the Minister of Finance, there is nothing for the latter to do but to resign.

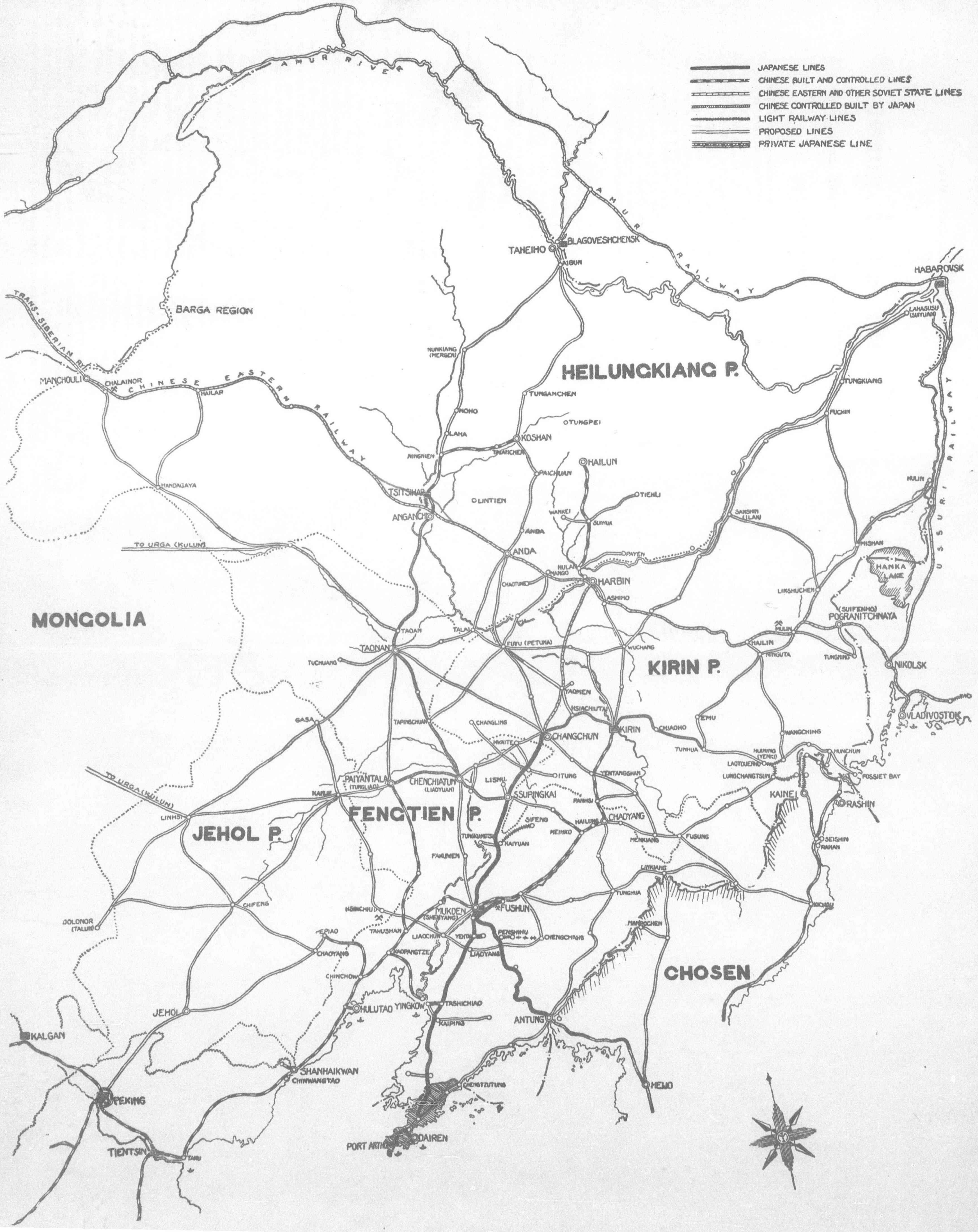
China does not need any financial assistance until her internal stability is assured. There are sufficient revenues collectable in China to defray all the legitimate expenses of the National Government and discharge its debt obligations. The only problem confronting the Ministry of Finance is to get these revenues paid into the treasury. The same applies to the railways. China's salvation must come from within and until the railways are brought under control of the Ministry of Railways and all the revenues of the Central Government are paid into the National Treasury, it is the height of folly for foreign investors or sympathetic foreign governments to put a premium on dishonesty, graft, disloyalty and insubordination, by pouring millions into China that will find their way into the pockets of the war-lords. All the loose money in the world could flow into China and disappear like water in the sands of the desert, until the armies are disbanded.

Mr. Hu Han-min, who seems to be the driving force in Nanking behind the silver loan campaign, tells us that there is a silver famine in the interior of China, that such a loan could relieve. Of course there is a silver famine in the interior. There is also every other kind of a famine in the interior. There is no food,

(Continued on page 13).

RAILWAY MAP OF MANCHURIA

Showing Lines in Operation and Proposed Chinese Net-work



Drawing Lines on a Map

The Manchurian Railway Tangle and What it May Lead To

By GEORGE BRONSON REA

MANCHURIA may be the most progressive and most prosperous part of China, but its Government certainly needs pepping up in publicity methods. If our advice is worth anything, we would suggest that the Mukden authorities advertise for the services of a Publicity Director or Propaganda Expert, one familiar with Manchurian geographical and place names, able to wield a road-pen and draw straight, parallel, crooked and curved lines on a map and above all preserve a sense of humor. This advice is gratuitous, cheerfully extended in order to save ourselves and other editors from a mental breakdown trying to verify and keep up with new railways projected for Manchuria by some one who obviously spends his nights drawing lines on a map and his days in spreading reports about the new railways that are to be built by the Northeastern Communications Commission.

Now we do not object to drawing lines on a map. It is an innocent pastime and we used to be rather good at it ourselves, but we were always careful to draw a line that would not create trouble for our Chinese friends by conflicting with their existing treaties, agreements or commitments. But these bright boys in Manchuria wot not of treaties and seemingly care less. After all, China is a sovereign state, Manchuria is Manchuria and the old treaties are all unequal. Anyhow, its up to Nanking to worry about foreign relations.

The Manchurian Board of Railway Strategy gathers around a big base map with an assortment of sharpened pencils and proceeds to business. The result is a beautiful example of artistic map drawing and we reproduce herewith the complete masterpiece. But this is not all. There is a Secret Military Map, locked up in the safe of the Manchurian General Staff, on which appear several additional strategic lines following the Russo-Chinese border, designed against the day when " Tovarish " Stalin and his Soviet cronies start any more monkey business with the Chinese Eastern Railway.

These introductory remarks may seem flippant and undignified but it is better to approach the subject from the humorous side than to take it seriously. For the past year or so there has been a steady flow of reports from Mukden concerning the building of new railways in Manchuria, until the total runs to over fifty-eight separate lines with an aggregate length of 7,500 miles to cost over $200,000,000. One gathers the impression that somebody in Manchuria is trying to emulate Dr. Sun Yat-sen by devising a system of railways that will connect up every city, town and village in the Three Eastern Provinces and take all the money that China can raise in the next few decades to build them. They may not like Dr. Sun's political principles in Manchuria, but they have grabbed his economic publicity ideas and gone him one better.

Most of these reports as published in the newspapers, are purported to be based on official information, in fact, several of the most important and all embracing projects were announced as the official program of the Northeastern Communications Bureau. When these reports bear the stamp of official approval and no attempt is made on the part of the authorities to correct or deny them, it is no wonder that they cause anxiety in Japan. It is not necessary to go back over a long period to review these reports. We take at random only a few of the most prominent published during the last four months :—

(1) On September 13, it was announced that the *Northeastern Communications Commission* had drawn up a scheme for the construction of ten branch railway lines in the next seven years. The cost, estimated at $15,000,000, was to be borne equally by the three Manchurian provinces and Jehol, and the various Manchurian railway administrations were to supply the balance. Engineers and surveyors were to start to survey this spring.

(2) On October 29, the report came from Mukden that the *Northeastern Communications Commission* had worked out a special railway construction program, covering 12 new lines, to cost $90,000,000, of which sum $40,000,000 was to come from foreign sources and the balance raised by special taxes on industry and commerce.

(3) On October 30, it was reported that the *Northeastern Communications Committee*, had instructed all Chinese railways in Manchuria to reduce their freight rates on export goods which were usually carried by the S.M.R. and to co-operate closer with the Peking-Mukden line.

(4) November 21 : *The Manchuria Daily News*, usually well informed on Manchurian affairs, published a news item to the effect that Marshal Chiang Hsueh-liang was accompanied on his trip to Nanking by a large staff of railway engineers and had received the consent of the National Government to several of his railway schemes in Manchuria, and that his plans would be put into immediate execution.

(5) December 3 : The *Northeastern Communications Commission* is reported as being engaged in a close study of the existing Sino-Japanese treaties as preliminary to drafting a plan for a new network of railways for Manchuria.

(6) December 10 : A Rengo dispatch from Mukden says :—

" Construction of new railways has apparently gripped the imagination of the Manchurian authorities. The building program recently approved by the *Northeastern Communications Commission* comprises 56 lines with an aggregate mileage of 10,000 kilometers. According to the scheme, the new lines to be constructed in South Manchuria will be between Taonan and Jehol, between Tiehling and Fakumen, between Kungehuling and Itungchow, and between Hsingching and Linkiang."

(7) December 12 : (Report from Mukden) The *Northeastern Communications Commission*, announces the plans for the construction of three railways this spring to cost $90,000,000. The proposed lines include :

(1) Tungliao-Heiho in Heilungkiang passing Taonan and Tsitsihar.
(2) Kirin-Mulin-Itan in Kirin.
(3) Hulutao-Urga, starting from Hulutao through Jehol and on into Mongolia to Urga.

(8) December 16 : The chairman of the *Northeastern Communications Commission*, is reported to have submitted a concrete plan for constructing the following three lines for national defence :

(1) The Tsitsihar-Heiho (Aigun) Line	.. 800 li,	cost	$20,000,000
(2) Tungkiang-Ilan Line	.. 400 ,,	,,	10,000,000
(3) Fushun-Kaiping Line	.. 300 ,,	,,	10,000,000

A glance at the map, will disclose that the line from Fushun to Kaiping not only parallels the S.M.R. but a short extension will bring it to the port of Newchwang. Furthermore, on November 28, the report was published that the *Northeastern Communications Commission* had completed all arrangements for constructing four highways this year in Manchuria, one of these being a highway from Kaiping to Fuchow, a junk port in the Liaotung peninsula, adjoining the Leased Territory border, another outlet for the proposed Fushun-Kaiping Railway.

(9) December 15 : *The Manchuria Daily News* published the full list of projected Chinese lines for Manchuria, as follows :—

" Of the multitudinous new railways planned by the *Northeastern Communications Commission*, Mukden, which are said to number more than 200 for the four Northeastern Provinces, what seem to have a chance to assume form are put at 50 odd, a list of which follows " :—

	Distance (Kilometers)		*Distance (Kilometers)*
Kirin-Wuchang ..	.. 162	Ninguta-Hailin ..	.. 23
Harbin-Ilan ..	.. 308	Mango-Chaotung	.. 35
Chaoyangchen-Antu	.. 358	Liaoyang-Lichiawopu ..	86
Heiho-Lintien-Anda	.. 112	Chihfong-Linsi ..	.. 270
Taonan-Jehol ..	.. 888	Mango-Hsinglungchen ..	88
Changchun-Talai	.. 212	Muling-Sanhsing	.. 265
Tsitsihar-Petune ..	.. 248	Tehui-Chiutai ..	.. 45
Hsiaochio-Lintien	.. 27	Imienpo-Wuchang	.. 97
Hulan-Hulikang ..	.. 463	Imienpo-Ilan ..	.. 225
Hailun-Nenkiang	.. 270	Hailannor-Solun	.. 480
Kungchuling-Itung	.. 57	Shihtouchengtzu-Yuchan	64
Tiehling-Fakumen	.. 56	Yenchi-Hunchun	.. 95
Panshan-Tahushan	.. 240	Tungpin-Wuchang	.. 165
Hsinlitun-Hsinchiu	.. 48	Hsinchiu-Linhsi..	(distance unavailable)
Anda-Paichuan ..	.. 175		
Linkiang-Antung	.. 275	Tsitsihar-Nenkiang	.. ,,
Hailin-Chingpohu	.. 138	Tunhua-Wuchang	.. ,,
Mishan-Fuchin ..	.. 288	Muling-Mutankiang	.. ,,
Fuyu-Harbin ..	.. 218	Harbin-Heikang	.. ,,
Kailu-Linhsi ..	.. 345	Mishan-Hulin ..	.. ,,
Kaitung-Fuyu ..	.. 148	Kirin-Ninguta ..	.. ,,
Shenyang-Liaoyang	.. 80	Mukden-Jehol ..	.. ,,
Changwu-Chengchiatun ..	28	Chaoyangchen-Mongkiang	,,
Kirin-Hulan ..	.. 208	Tachiakou-Tahochuang .	,,
Mango-Chingkang	.. 92	Sanhsing-Imienpo	.. ,,
Yaomen-Tehui ..	.. 22	Fuhsin-Lichiawopeng ..	,,
Lingkiang-Changpai	.. 184	Ssupingkai-Takata	.. ,,
Hsingking-Linkiang	.. 320		

(10) December 26: *The Manchuria Daily News,* says that: " The Chinese new lines under project, work on which is to be commenced next spring as the first stage programme of the railway network for the Northeast, comprise :—

(1) Kirin-Wuchang.
(2) Mukden-Liaoyang.
(3) Mukden-Jehol.
(4) Ssupingkai-Takata.
(5) Harbin-Ilan.
(6) Taonan-Jehol.
(7) Tiehling-Fakumen.
(8) Panshan-Tahushan.
(9) Linkiang-Antung.
(10) Yenchi-Hanchun.
(11) Tsitsihar-Heiho.
(12) Harbin-Heiho.

"*The Northeastern Communications Commission* is declaring that engineers will be despatched shortly to the respective routes to carry out necessary surveys."

After such a brilliant exploit of building railways in the air, it might be supposed that the Manchurian Board of Strategy would rest a while from it's labors. But no, on January 6, we were informed that the indefatigable *Northeastern Communications Commission* had decided to start immediate construction of a line between Chihfeng and Chaoyang to develop the Jehol hinterland. Chihfeng would become the railway center for lines linking it with Jehol, Dolonor, Linhsi, Kailu and Chaoyang. The cost was only an insignificant $50,000,000.

It is to be noted that most of these reports emanated from Mukden during the absence of the Young Marshal who, as the Japanese affirm, was accompanied on his visit to Nanking by a group of railway experts and engineers in order to impress upon the National Government the urgent necessity of approving his program. These facts lead to the suspicion that the flood of reports concerning the activities of the *Northeastern Communications Commission* were circulated either to support the Young Marshal's diplomacy, or in his absence some enthusiastic subordinate "spilled the beans " as to the official program.

It is no wonder that the Japanese began to sense that something was happening behind the scenes that boded no good to the S.M.R. The Japanese newspaper correspondents unearthed the details of an alleged secret understanding between Marshal Chang and Nanking and reported it to their home offices. The whole program is so fantastic, so rabidly anti-Japanese, that taken in connection with the agitations of the past few years, it gave rise to considerable anxiety.

This alleged policy as published in the *Osaka Mainichi* lays down the following formula :—

" 1. That the Chinese educational system shall be improved in such a way that anti-Japanese sentiment shall be permanently inculcated in the people. (*This is nothing new. It has been going on for some years*). 2. Friendly relations shall be established with Russia in so far as Manchurian issues are concerned, and to facilitate this, all pending issues between the two countries shall be settled at once. 3. Port and railway improvements in Manchuria will in future be carried out solely by China and Japan will be given no more concessions. A railway policy to be devised that will eventually compel Japan to surrender the South Manchuria Railway at a low price. 4. All diplomatic issues between Manchuria and Japan to be transferred to Nanking so that their settlement can be delayed as long as possible. 5. All Manchurian debts to Japan to be transferred to the Ministry of Finance at Nanking. 7. A boycott of Japanese goods to be conducted and the economic independence of Manchuria established. 8. Withdrawal of the Japanese garrisons stationed in North China as well as the railway guards in the S.M.R. zone. In case these demands are not complied with, anti-Japanese agitations are to be started."

Ordinarily, such a provocative program would be maintained a profound secret and its publication regarded as the vaporings of a disordered newspaper mind. Unfortunately, however, every item of news that comes out of Manchuria and even some from Nanking tends to strengthen the above report. Even the official bulletin of the Ministry of Commerce, Industry and Labor, publishes the story that the Government is planning to redeem the three Manchurian railways built with Japanese capital as a step towards eliminating Japanese influence and depriving the S.M.R. of essential feeders whose traffic would then be diverted to the main Chinese lines. The *Jiji* correspondent at Nanking learns that the Executive Council has instructed the Foreign Minister to demand from Japan the recession of the great Fushun Coal Mines in order to incorporate them in the state monopoly now under consideration. On sale in the Chinese bookstores in Mukden is a highly colored lithographed map of Manchuria, showing over fifty proposed railways, displaying in large type, the name of Marshal Chang Hsueh-liang. And so it goes. All these reports were given out as official propaganda of

Building Manchuria's Railways

American Steel for the Kirin-Heilung Railway Bridges

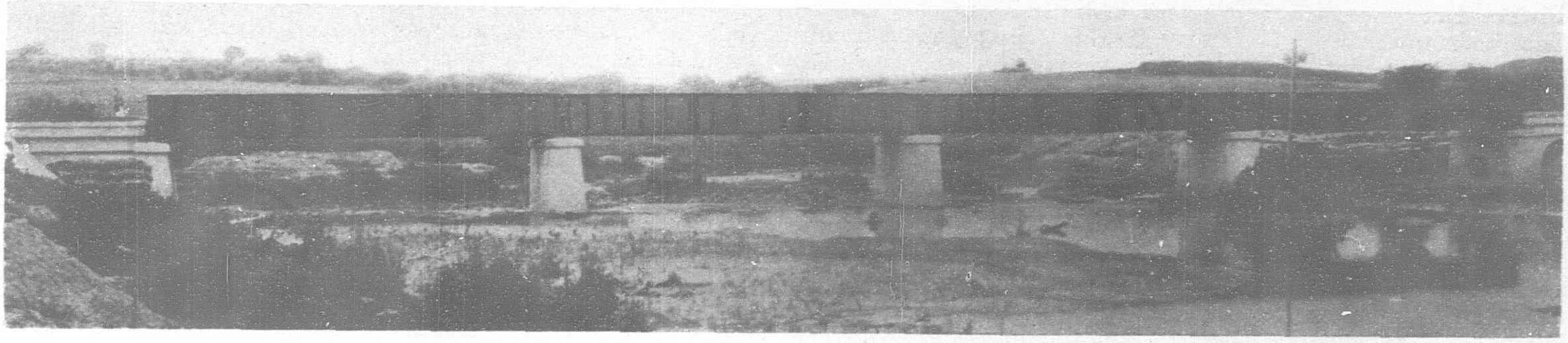
We reproduce on Page 11 several illustrations of the types of bridges on the Kirin-Heilung Railway, furnished to the Manchurian railway authorities by the United States Steel Products Company through the well-known firm of Andersen, Meyer & Company, Ltd. During June 1928, a contract was signed by the above parties for the supply of 244 bridges, 33 being deck plate girder spans, 14 through plate girder spans and the balance single and double beam spans. The total contract price was G$132,300.

The bridges were fabricated by the American Bridge Company at their Baltimore plant, the total weight of materials on this contract being 3,335,000 lbs. The order for these bridges was entered with the American Bridge Company toward the end of July, 1928, and the first lot was shipped on September 16, on the Isthmian Steamship Company's vessel, the s.s. *Steel Inventor*, or within eight weeks after receipt of order, completion of detailed drawings and assembly of fabricated material. The second lot of bridges cleared on the s.s. *Bessemer City* on October 18, or about four weeks after the first lot, an indication of the prompt dispatch offered by this company for the supply of heavy fabricated material to Chinese railways.

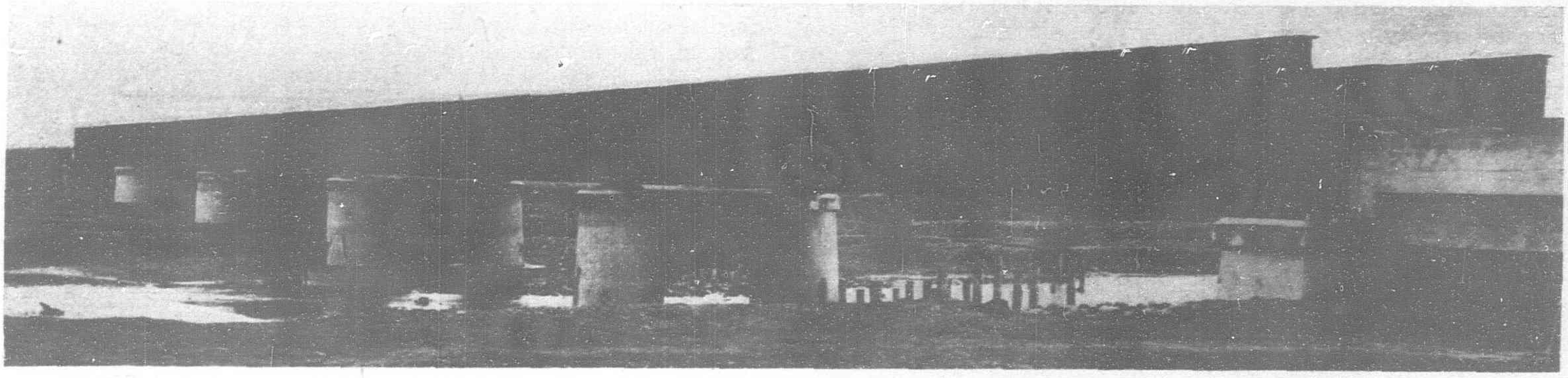
The four photographs show the installation of some of these structures, which are also indicative of the excellent engineering work performed by the Chinese engineers who had charge of their erection. In addition to the supply of bridges, the United States Steel Products Company furnished to this railway, 21,000 tons of both 80 lb. and 60 lb. rails, at a contract price of nearly G,$1,000,000. The order for these rails and switches was obtained at the end of November, 1927, and shipment from mill commenced at the end of December, or within four weeks, and they were delivered at Dairen, two months afterwards. This typical Chinese railway in Manchuria built entirely with Chinese money and by Chinese engineers, was practically equipped throughout with material of the United States Steel Products Company supplied through Andersen, Meyer & Company.

RAILWAY CONSTRUCTION IN MANCHURIA

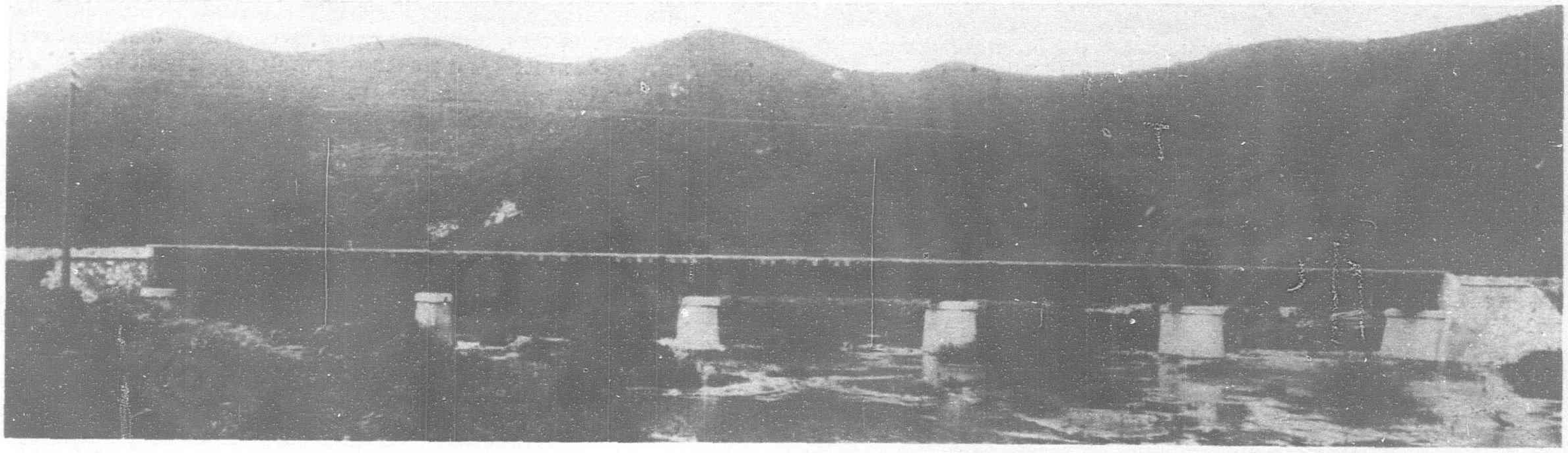
Types of Bridges on the Kirin-Heilung Railway: Supplied by the United States Steel Products Company



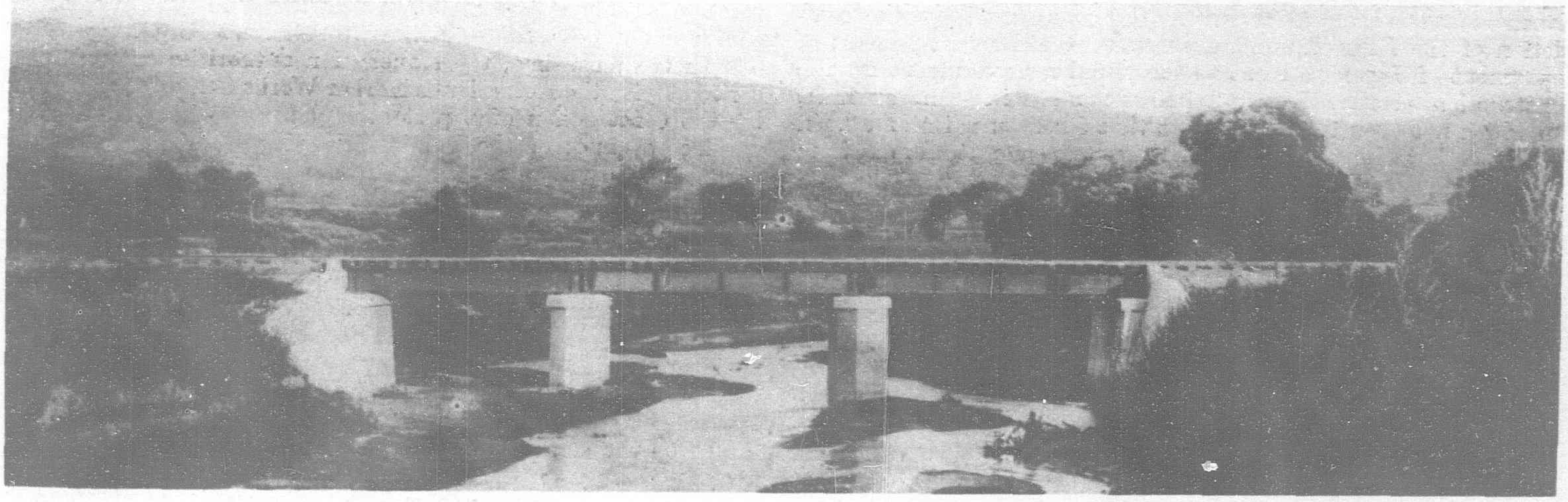
Shiao Cheng Tze Bridge: Four Spans of 20 Meters



Yen Tung San Bridge: Five Spans, of 20 Meters



Shiao Cheng Tze Bridge: Five Spans, of 20 Meters



Hsi Yang Bridge: Three Spans (Two of 6m. and One of 5 Meters the *Northeastern Communications Commission*, and the colored map bears the stamp of official approval. No attempt was made to deny or rectify these statements until it seemed that the Japanese Government might ask for an explanation. Faced with this possibility, official spokesmen for Mukden declare that most of these lines originated in the minds of irresponsible Japanese newspapermen; that the map bearing the name of the Young Marshal is unreliable, published by private interests without the sanction of the Communications Commission; that even the official information on Manchurian railways contained in the *Chinese Economic Bulletin* issued by the Nanking Government, is inaccurate and misleading.

The outside world will perhaps never know what understanding was arrived at between the Young Marshal and the National Government on his recent visit to Nanking. The Japanese newspapers, however, are unanimous in that an agreement was reached whereby all diplomatic questions concerning Manchuria should be handled by Nanking and that a strong anti-Japanese policy should be inaugurated to drive Japan out of Manchuria. The publication of these reports in Japan, supported by the flood of railway propaganda originating in Mukden, caused alarm and anxiety, and there are indications that Japan's Manchurian policy is to be overhauled to meet these new conditions.

When the first report of the Young Marshal's understanding with Nanking reached Japan, the Japanese press announced on the authority of the Foreign Minister that no matter what agreement was arrived at between the heads of the two Chinese factions in regard to Manchurian affairs, Japan would continue to deal direct with Mukden in all matters concerning railways and other rights acquired by treaties and agreements signed by the Manchurian authorities. The Japanese Government would not permit the Young Marshal to evade his responsibilities in these matters by handing over to Nanking the existing obligations to Japan without consulting her.

For over a month, responsible Japanese officials have been endeavoring to allay the fears created by the newspaper reports of the Chinese program in Manchuria. The Chinese Minister at Tokyo called on Foreign Minister Baron Shidehara and denounced the stories as falsehoods, manufactured out of whole cloth, affirming that the Nationalist Government had no intention whatever of adopting an anti-Japanese policy or of building new railways in Manchuria that would injure the S.M.R. Nanking also hastened to declare the stories false. Baron Shidehara, in answer to questions put by his cabinet colleagues, preferred to believe that Nanking and Mukden were anxious to remain friendly with Japan and to work with her. He preserves a calm, statesmanlike grasp of the situation. Official Japan is extremely reticent, correct, and hopes for the best, doing nothing nor saying anything that could excite the slightest criticism.

There are certain facts which no official negation can set aside, and which have undoubtedly decided Tokyo to demand a friendly show-down in order to avert serious complications. China's railway projects in Manchuria are apparently more than a mere blue print menace to Japan. Mr. E. Kimura who resigned as Director of the Asiatic Bureau of the Japanese Foreign Office to take over the duties of Director of the South Manchuria Railway Company in charge of its political affairs, has been instructed to communicate Japan's ideas to the Mukden authorities, and press 1, for the completion of the Kirin-Tunhua Railway to the Korean border; 2, repayment of Japanese loans to the Mukden Government for the construction of the Taonan-Tsitsihar and Kirin-Tunhua lines, (on which not even the interest has thus far been paid) and 3, an assurance that China will not violate her agreement to refrain from constructing parallel lines competing with the S.M.R.

Press dispatches from Tokyo dated January 12, to the effect that Mr. Kimura would open negotiations on February 10, on the return of the Young Marshal to Mukden, was followed on the 14th by the announcement that the Young Marshal would remain in Peking and his uncle, Marshal Chang Tso-hsiang would assume full charge of Manchurian affairs. This sudden shift in the Chinese political line up, however, will make no change in the Japanese program for a settlement of Manchurian railway problems. If the Young Marshal is not to be the head of affairs in Mukden, negotiations will be conducted with his uncle, General Chang Tso-hsiang.

It is no secret that the Manchurian war-lords have been at loggerheads over the building of new railways, each provincial ruler doing his best to build and control lines that open up disputed territory and divert to his own treasury the revenues of his rivals. A glance at the map will show that the whole trend of the proposed construction program is to attract all the traffic from north and east down over the lines of the Mukden Government to the deep-water harbor under its control. This means that all the produce exported from Kirin and Heilungkiang, as well as all the goods imported from abroad for the consumers of these regions, must pay tribute to Mukden. The interests of the people of Kirin and Heilungkiang would be immeasurably advanced by the completion of the Kirin-Tunhua line to the Korean border, where they would have easy access to a deepwater outlet in close contact with their best customer and the nation which supplies them with the bulk of their manufactured requirements. Nationalism and patriotism as expressed in anti-Japanese agitation may be profitable for the Mukden oligarchy but the people of Kirin and Heilungkiang must pay the bill. Now, it is just possible that General Chang Tso-hsiang, having the best interests of his own bailiwick at heart, may be much more ready to agree to Japan's request to extend the Kirin-Tunhua line to the Korean border than his nephew and his Mukden advisers. General Chang Tso-hsiang, while just as patriotic as his nephew or Nanking, is also a very shrewd business man, with many personal investments that are being rendered worthless unless the railway deadlock is broken. The Kirin overlord is not likely to adhere to a program that makes his province pay tribute to Mukden and there is reason to believe that when Mr. Kimura and he get together on these matters, they will find a way out of the impasse.

Japan's position is reasonable and understandable. Japanese initiative, brains, and money, poured into Manchuria, created its industries and developed a market for its products. The Chinese, it is true, contributed their share, but the prosperity of the Three Eastern Provinces was made possible by the enterprise of the people who developed its resources and whose presence has been a guarantee of peaceful and stable conditions. The Japanese advanced the funds to the Chinese Government to construct the Kirin-Changchun and the Tsupingkai-Taonan railways. They then built the Kirin-Tunhua and the Taonan-Anganki lines, supplying the funds and equipment, and handing the completed lines over to the Mukden Government for operation.

Although these last two lines have been most profitable since their completion, the Chinese have not even paid the interest on the funds advanced, using the revenues from these lines to build other lines that take the business away from the Japanese S.M. railway. The Mukden authorities have also conducted a steady campaign to interest foreign capital in financing its railway and industrial schemes, openly advertised as being designed to strangle Japan's economic interests in Manchuria. A year and a half ago, representatives of Stone and Webster, of New York, arrived in Mukden to arrange for the financing and construction of the Solun-Manchuli and other lines, to be paid for by the bonds of the Mukden Government. When these negotiations collapsed, Mukden turned to the Germans and endeavored to interest them in a $50,000,000 loan to build several new railways in Manchuria based on the port of Hulutao. These plans also fell through. The Young Marshal it is reported then entered into negotiations with "a British capitalist" to establish a bank at Mukden with a capital of $30,000,000 to finance his railway schemes, and coincident with this report came the rumor that the Skoda Works of Prague had signed a secret contract to supply the Manchurian railways with rolling stock and equipment and construct a railway from Solun to Urga.

In the meantime, the Manchurian authorities entered into a contract with the Netherlands Harbor Works Co., a Dutch concern, for the construction of a port at Hulutao, financing it from the surplus revenues of the Peiping-Mukden railway, previously set aside as security for certain British loans. The British Government formally protested against this violation of agreement, but the work proceeds nevertheless. The Chinese have proceeded with their railway construction plans by utilizing their own funds as far as possible, creating a system of Chinese owned lines that must eventually impair the valve of the S.M.R.

It may be true that the Chinese have no intention of violating their agreements with Japan, but they are certainly creating that impression. Every news agency in Manchuria has circulated the report that the *Northeastern Communications Commission* has approved the construction of a short line, fifteen miles long, connecting Yaomen on the southern section of the C.E.R. with Hsiachiutai on the Kirin-Changchun line. The cost is put at $3,000,000 (silver) and work is to be started in February of this year. The S.M.R. derives a good share of its freight from the C.E.R. southern district, and any interference with this source of revenue will seriously affect its prosperity. A glance at the map will show that the line is obviously designed to deprive the S.M.R. of this traffic and divert it to the Chinese Kirin-Changchun and down the Kirin-Hailung-Mukden lines to the Peking-Mukden and the port at Hulutao. It is also reported that the Yaomen-Hsiachiutai link will be extended on to Petune, thus effectively nullifying the right conceded to Japan to build a railway into this region from Changchun to Taonan.

The Chinese have also projected a line from Harbin to Kirin, with two or three other connecting links between the Kirin system and the C.E.R. In the meanwhile, they are buying rolling stock, bridges, rails and other equipment in large quantities from America, Great Britain, Germany and Czecho-Slovakia, paying for the material from the profits of the existing lines. Further details of thi situation are hardly necessary in order to understand Japan's uneasiness.

Japan has an agreement with China to extend the Kirin-Tunhwa line to the Korean border, where it will link up with the Korean State Railways and a deep water port at Seishin. Confident that the Chinese would live up to their bargain, the Japanese advanced the funds and built the Kirin-Tunhua line for the Chinese, only to be told after they had completed the task, that under no consideration could the line be extended beyond Tunhua. Instead of repaying Japan for the two railways built for them, the Chinese not only have not paid the interest on the loans, but have used the profits of these railways to purchase materials from other countries and to build new lines designed to destroy Japan's investments in Manchuria.

Notwithstanding the official denials from Nanking and Mukden that there is no foundation to the reports circulated concerning the anti-Japanese understanding, the Japanese press agencies continue to assert the contrary. A *Dentsu* dispatch from Peiping, dated January 8, says :

> "In the face of Marshal Chang's flat contradiction that the railway net-work plan in Manchuria-Mongolia is all a hoax, the Northeastern Communications Commission headed by Director Kao of the Peiping-Mukden line has completed a study on how to materialize the plan which is now ready for execution."

Either the Japanese newspaper agencies are extremely gullible and accept every rumor as fact, and are carrying on a campaign to arouse their people against China, or there is something wrong with Mukden's publicity methods.

Japan apparently is no hog. She does not object to the building of new lines, providing they do not parallel too closely with the S.M.R. or deprive it of its revenues. Japan is willing to assist China in developing Manchuria, either alone or in co-operation with other nations, but insists that there must be some recognition of her rights as conceded in past treaties and agreements and a more faithful observance of obligations incurred. Japan is willing to make sacrifices in order to arrive at an equitable and amicable adjustment of these questions that will permit both nations to co-operate harmoniously for the development of Manchuria, and Mr. Kimura has been instructed to bring these issues to a head in a friendly pow-wow with Mukden. The result of the pending negotiations will be awaited with interest, as upon a favorable solution of these problems depends not only the future of Manchuria but the security of Japan. The menace of Soviet Russia in the North is assuming such alarming proportions, that if Japan does not succeed in arriving at some understanding with Mukden, while there is yet time to fortify her position, the consequences may be disastrous for both nations.

The National Government of China in its present bankrupt condition can obtain no financial assistance from abroad for railway construction. Neither can Mukden. The only hope for China to strengthen her defenses in the Northeast is through some amicable understanding with Japan, whereby the S.M.R. can raise the funds and build the railways vitally essential to the security of both nations.

That Silver Loan

(Continued from page 8)

no work, no security, no guarantees of life, no hope—nothing. And why ? Simply because there is no government that exercises any authority outside certain restricted areas. All the wealth of China is now concentrated in Shanghai, driven into the safe precincts of the International Settlement to escape confiscation by the ever-hungry war-lords and the ravenous tax-collectors of Nanking. If two hundred million ounces of silver were dumped into the interior of China to-day, it might bring temporary relief to some millions of destitute Chinese, but it would all gravitate in a few months back into Shanghai to swell the hoardings of the Chinese war-lords and their henchmen.

The following editorial from the *Shanghai Sunday Times* of January 25, so fully reflects our own thoughts on the proposed silver loan, that we reproduce it in full :

"The latest information from Nanking and Washington enables us to form a better understanding of the situation in regard to the proposal that the United States should lend China a thousand million ounces of silver than was possible during the past week, when we were deluged with contradictory reports. It is now clear that strong divergent opinions are held in China on this matter, and that, while the State Department at Washington knows nothing of the proposed silver loan, certain American interests are investigating its feasibility, being keenly desirous of finding a profitable market for so much surplus metal. Mr. Hu Han-min's warm advocacy of the proposed loan points to the Chairman of the Legislative Yuan being either the originator of the scheme advanced by Mr. Linebarger, a Nanking adviser now in the United States, or his backer in China, despite the Finance Minister's "no new loan" policy. On the other side of the Pacific there is a small body in Salt Lake City, composed of minor silver producers—large producers are not involved—and a few local politicians, which discerns in Mr. Linebarger's proposal a profitable means to relieve the American market of a substantial quantity of silver at this time, with the prospect of it being returned fifty years hence, long before which date it is confidently expected the present chaos in the economic world will have passed in favor of stability.

"Readers will no doubt have been somewhat amused by the proposed terms of the silver loan Mr. Hu Han-min set out. It is hard to believe that any lender would entertain them for one moment. Mr. Hu specifically states that the loan 'shall be made by the United States Government to the Chinese Government for constructive projects and the development of Sino-American commerce.' This is very attractive. But a further influx of silver to China now would ruin trade. Further, the American Government has no knowledge of the present loan proposal, and no American loans are granted these days without the prior consent of the State Department in Washington. Moreover, we have abundant evidence that the State Department is convinced of the absolute folly of shipping more silver to China at this time, so that it is not only unlikely that the Government will now, or in the near future, make the loan itself or consent to any American group doing so. The second article of the proposed loan agreement as stated by Mr. Hu, says that the one thousand million ounces shall be handed over to China in five equal instalments, the first of which is to be made in July next. Mr. Hu appears to presuppose that the United States Congress will put aside its not altogether unimportant tasks in order to render China what many able men both here and in the United States believe would be a singular disservice. In order to put through this transaction the American Government would require to obtain the authority of Congress, which could not be done in ten minutes. First, a Bill to cover the loan would have to be introduced into committee ; then, after discussion in the Senate, it would have to go through the many stages involved in Lower House procedure. Inasmuch as no steps have yet been taken, it is not easy to see how Mr. Hu can expect some of the silver at Nanking by July. The third term of the loan sets out that interest shall be at the rate of two per cent the period to be fifty years, but that after 1941 the Chinese Government may redeem the loan either by silver or gold payment as it seems fit. To cap these liberal conditions, the next article declares that there shall be no security for the loan. After this it is not surprising to learn that a joint commission consisting of representatives of the Chinese and American Governments shall be formed to supervise the use of the loan, while a special bank may be established for its management. It scarcely needs to be stated here that this is contrary to all tendencies in China to-day and to the policy of the Finance Minister.

"Now what is to become of this silver loan ? Mr. Hu tells us that it will not cause a further drop in silver value, but as it

(Continued on page 34)

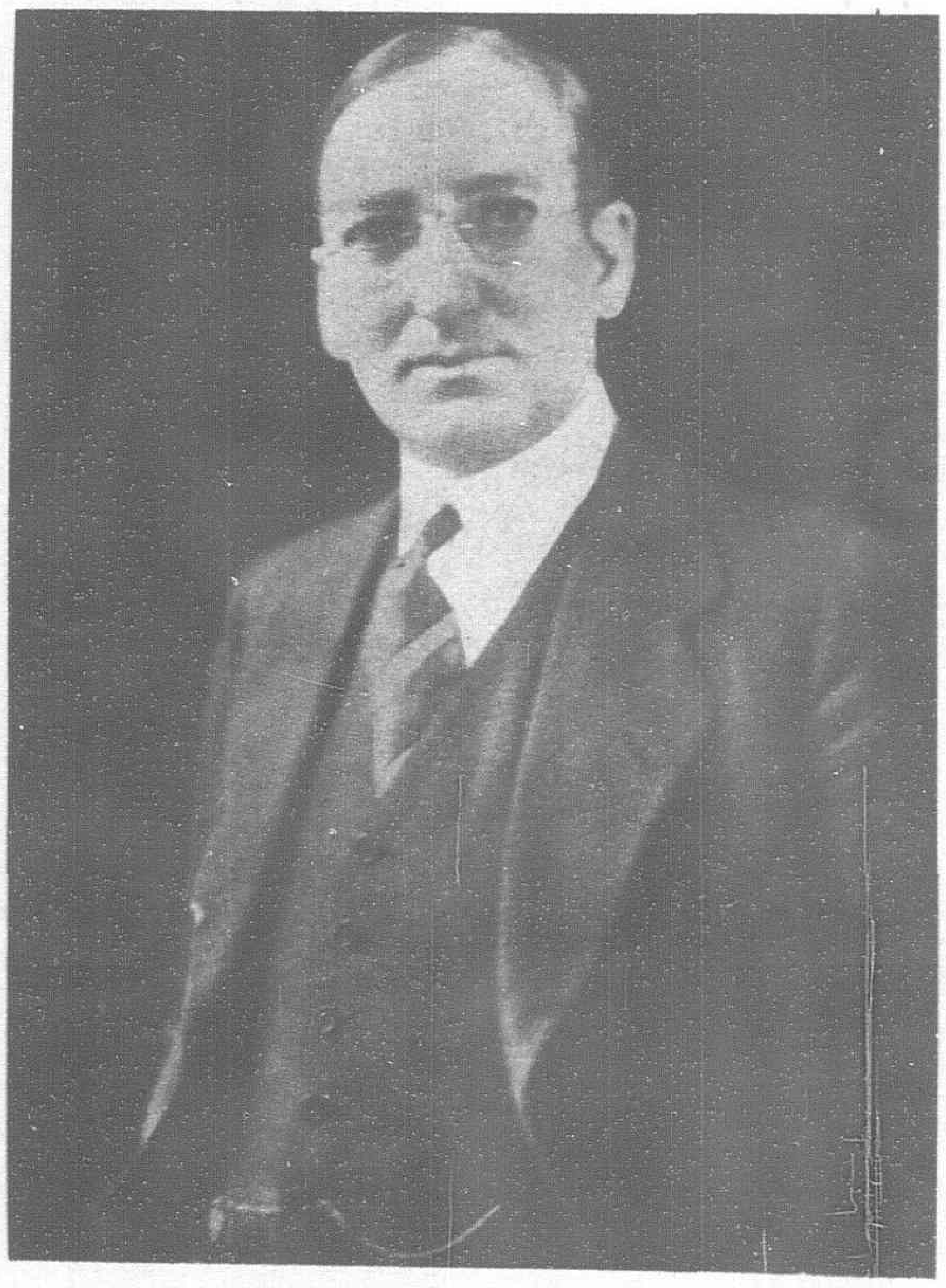
The Soviet Railway System

By RALPH BUDD, President of the Great Northern Railway

DURING our visit in U. S. S. R., we found the railways functioning quite normally and freight and passengers being moved with fair promptness. During 1929, the average density of freight traffic (ton miles per mile of road) was 90 per cent of the average for the railways of the United States and the density of passenger traffic was more than three times as great. With the increase which has occurred in U. S. S. R. this year, the railways probably will handle more tons of freight per mile of road than will those of U. S. A.

While the traffic density is as great as in the United States, the volume of traffic is much less. The U. S. S. R., with a greater population and vastly greater area, has less than one-fifth of the railway mileage of the United States. The amount of traffic, however, has been increasing rapidly and the industrialization program which is being carried on is increasing the movement of freight on existing railways and requires the construction of new lines. The Turk-Sib (Turkestan-Siberian) line, 890 miles in length, has been practically completed and will be in regular operation by the end of 1930. Other railway lines are under construction. The problem of constructing new branch railway lines to serve new territory is similar to the problems met by the railways of the western United States during the past fifty years and after the first through lines were built.

The problem of handling an increase in traffic on existing lines is a more difficult problem because a change in the system of railroading and in the types of equipment and facilities is necessary to handle this traffic with the greatest economy. The present system of railroading is that used in other European countries. Locomotives and 90 per cent of freight cars are small and trains are of light tonnage. The consequence is that many trains must be run to move the traffic and the many trains require double tracking where in America a single track line with heavier trains would be sufficient.



Mr. Ralph Budd, President of the Great Northern Railway, Who Recently Made a Study of Soviet Railways

The Russian trains are dispatched from station to station and it is necessary for a train to clear a station before a following train may be dispatched from the preceding station. The American dispatching system is not used and block signalling has only been installed on a few miles of track more as an experiment than as a part of a general signal system. The European system of railroading is possibly very well adapted to the conditions of the smaller European countries where length of freight movement is short and heavy tonnage trains are not desirable, but the same system is not economical where hauls are long and there is much bulk freight as in the United States and in the U. S. S. R.

As distinct from the European system, the American system of railroading is predicated upon the use of heavy trains drawn by heavy and powerful locomotives. Large capacity freight cars are used (3 to 4 times the size of those commonly used in U. S. S. R.). Locomotives are equipped with tenders having a capacity as large as 22,000 gallons, making long runs between fuel and water stations feasible. Trains are operated on timetable schedules or special orders transmitted from a train dispatcher to the train crews. The train crews are responsible for the safe and speedy handling of trains and not the station masters. This system has proved very satisfactory in the United States and should be found equally satisfactory in U. S. S. R. where conditions are strikingly similar.

The topography of U. S. S. R. is like that of the western United States except that a lesser proportion of the former is mountainous and the mountains that are crossed by its railways are lower and less precipitous than those over which American railways operate. In general the climate in any state west of the Mississippi can be found duplicated in U. S. S. R. although extreme winter temperatures in a few parts of U. S. S. R. are lower than temperatures within the United States. Moreover, the commodities handled are much the same in the two countries; farm products, coal, ore, and oil predominate. While distances in U. S. S. R. are greater, the haul of the principal commodities and the distances over which the heaviest traffic is handled are not unlike those of America, so that the average haul of all commodities is only forty miles longer than in the United States.

In order to handle the large increases in traffic which are expected in U. S. S. R., there must be additional trackage and railway equipment. Train tonnage cannot be increased generally because of lack of strength of couplings of cars as well as inadequacy of motive power. The first and most difficult change to be made is from the screw car couplings with side bumpers to the automatic coupling. With automatic couplings and tracks strengthened by placing additional ties, it will be possible to place in service locomotives heavy enough to increase train weights by 50 per cent. The extension of the use of air brakes on freight equipment from the 10 per cent of cars now equipped to complete equipment with such brakes will have to follow as fast as possible. New freight equipment purchased would be of modern design and large capacity, and eventually the present cars of 16½ tons or less should be scrapped.

As the size of motive power is increased and the length of trains increased, the length of terminal tracks and size of terminal facilities will have to be increased. In the interests of economy, gradients, which on main lines are now generally steeper than are necessary, should be reduced. For safety and economy in operating trains, block signaling should be introduced on the heavy traffic lines as soon as 30 per cent of the cars are equipped with air brakes. With the increase in weight of motive power, a heavier track structure must be adopted, with not only more ties but larger ties, heavier rails, heavier and better fastenings, and better ballast. Many hand operated facilities should be replaced with mechanical facilities.

While this is a large and expensive program of work, like work has been accomplished in America, where during the past twenty-five to thirty years main line tracks have been rebuilt, terminal facilities have been enlarged, and equipment has been replaced with new, larger, and more efficient equipment. The difference in problem in U. S. S. R. lies largely in the time element. Aside from the necessity for at once changing from the screw coupler to the safe automatic coupler, strong enough for use in heavy trains, and for the speed which may be required for other improvements in order to meet the conditions imposed by the industrialization program, the problem facing the Russian railways is similar to that which has been met and solved by every great railway system in the United States.

Railway Transport in the Soviet Union

A Statistical Review

In the past year considerable attention has been devoted by Soviet economic authorities to the transport situation. Plans have been outlined for a thorough-going reorganization and reconstruction of the railway system in order to bring it to a position where it will be able to meet the enormous demands made by the extensive industrialization program and the development of agriculture through the organization of large-scale collective and state farms. American technique may play an important part in this development, as it is realized that physical conditions make American methods more feasible than European.

During the world and civil wars about one-fourth of the whole railway system of the country, at no time adequate for its needs, was destroyed. The damage wrought included the destruction of about 8,000 railway bridges and the burning down of hundreds of stations. More than half of the locomotives were in disrepair in 1921, and the total operations of the railways in that year fell to only 21 per cent of 1913.

The reconstruction program started then has resulted not only in rehabilitating the railway system to the pre-war level, but has brought it far beyond that level. In 1929-30 freight operations showed an excess of 100 per cent over 1913, totaling 138 billion ton-kilometers as compared with 65.7 billion in the last pre-war year. But in spite of this development, and of the fact that freight operations in 1929-30 exceeded the control figures for the year by 7 per cent and the program by 27 per cent the railways have been unable to meet the requirements of the general economic development.

The Five-Year Plan for the development of the railway system, laid down in 1928, called for a growth during the period of 147 per cent in freight operations and 66 per cent in passenger operations. The Plan provided for capital investments of 4,692,000,000 rubles for reconstructing the existing railway network and 2,258,000,000 rubles for new lines, or a total of 6,950,000,000 rubles ($3,579,000,000). The estimated requirements for the five-year period included 3,000 new locomotives, 200,000 new cars, 24,000 kilometers of rails for existing roads, 18,000 kilometers of new roads, 7,000,000 tons of metal, 95,000,000 creosoted ties, 5,000 kilometers of automatic signaling, 59,000 kilometers of despatcher service, the introduction of automatic coupling and the complete installation of air brakes.

However, the industrial and agricultural development of the Soviet Union is proceeding at an unforeseen rate. The original period for the realization of the Five-Year Plan having been reduced to four years the estimates for transportation have had to be considerably enlarged. It is expected that the original five-year program for freight shipments will be fulfilled in two and one half years.

The revised program for transportation calls for starting the construction of 22,500 kilometers of railways within the five-year period; of this total 20,900 kilometers are to be completed during the period. The new plan represents a 20-25 per cent increase over the original five-year program. About 40 per cent of the new railways are predominantly of industrial importance and about 55 per cent of importance to agriculture. The outstanding example of new railway construction is the Turkestan-Siberian Railway, completed in May 1930. This extends over a length of 1,445 kilometers and was built at a cost of $100,000,000. During the fiscal year 1929-30 work was started on eleven new lines and the total length of railways under construction was 11,039 kilometers, more than double the figure of 1928-29. The plans of the Commissariat for Transportation call for work on the construction of 11,300 kilometers of railways during 1930-31. During the past twelve years 13,398 kilometers of railway lines have been constructed.

The revised plan (control figures) for freight operations in 1929-30 set the freight turnover for railways at 240,000,000 tons, as against 212 million tons estimated in the Five-Year Plan. The returns for the year showed that 234,000,000 tons of freight were carried, an increase of 33.8 per cent over 1928-29.

A great increase in passenger traffic was also recorded for the last fiscal year, the number of passengers totaling 510.2 million, a 50 per cent increase over 1928-29 and 12.5 per cent over the original plan for 1932-33.

The plan of new construction for the year was not realized in full. Capital construction on existing and on new railways amounted to about 74 per cent of the program. This was due mainly to inadequate supplies of steel and building materials, and also to the fact that thousands of skilled workers left their jobs to work in better paid industries. The cost of capital construction during the year amounted to 679,000,000 rubles ($350,000,000) as compared with 415,000,000 rubles in 1928-29.

The number of locomotives in disrepair increased. Rolling stock was not utilized to the best advantage, due in part to poor organization, both on the part of the industries and organizations served by the railways and of the railways themselves. Whereas the daily run of freight cars was set at 109 kilometers in the plan, the actual average run was only 95.3 kilometers, as against 89.7 kilometers in 1928-29. The daily run of freight locomotives (156 kilometers) was also under last year's average. The average speed of freight trains, which was set at 14.7 kilometers in the program, amounted to 13 kilometers—0.8 kilometers less than in 1928-29.

During the current year the freight program of the railways is set at about 50 per cent higher than the results of last year. The control figures for the fiscal year 1930-31 provide for a freight turnover of 340 million tons. Passenger operations for the year are estimated at 62 billion passenger-kilometers, about double the 1928-29 figure.

A total of 1,000 new locomotives has been ordered for 1930-31. In the reorganization of the railway system about 3,000 of the existing type of locomotives will be replaced by 80-ton high-powered engines. New freight car construction has been fixed at 90,000 two-axle units for the coming year, and 5,000 tank cars. A tentative plan has been made for the production of 2,550 new passenger cars.

The general reorganization of the railway system in the Soviet Union will be carried out to a considerable extent on the basis of American experience.

The measures decided on for the development of railway transport are divided into two periods. The first period, covering the next few years, will aim at the maximum possible utilization of the existing railway system, with the aid of certain necessary reconstruction. During the second period considerable investments are planned for a thorough reorganization of the system, including the use of heavier rails. Within the next four or five years from 12—15,000 kilometers of heavy rails must be provided for in districts where particularly heavy freight traffic is expected. In view of the particularly heavy freight and passenger transport expected on certain sections even the introduction of heavier rails and locomotives, automatic coupling, etc., will be inadequate. To meet the situation in such sections, Mr. Sulimov pointed out that block signaling and the use of electricity will be required. Furthermore, in view of the vast development of power generation throughout the U. S. S. R. electric locomotives are bound to become an important factor.

New regulations concerning railway management have recently been drawn up. These provide that the entire control and management of a road be vested in a director who works according to the program laid down by the Commissariat for Transportation. Many operating and administrative details formerly under the direct control of the Commissariat are now decentralized and handed over to the respective railways. The extent of railway construction, the number of workers and technical employees, wages, productivity, cost estimates for the basic types of production, the program of capital investments and building, the necessary financing, etc., are specified in the program.

The Commissariat for Transportation is now calling on experts in other countries to collaborate in the task of reorganizing the transport system. Already about a hundred railway specialists are being engaged in Europe, the United States and Japan. Several engineers have been engaged in Germany, some of whom will reorganize five locomotive repair shops. Ralph Budd, president of the Great Northern Railroad in this country visited the Soviet Union in the summer of 1930 as a consultant on technical problems.

Over two hundred Soviet experts and recent graduates of technical institutes are scheduled to go to Europe and America to specialize in specific branches of practical transport work. This group also includes railway engineers, executives, technicians and workers who will study new developments in Western countries for periods varying from three to seven months.

The Key to Struggling China: A Drama of Three Zones

Achievement of Nationhood Depends on Whether these Distinct Economic and Geographical Areas can be Firmly Welded—A Clash between an Ancient Culture and the Civilization of Industrialism

Reprinted from "The New York Times"

China is to-day the stage of perhaps the most fascinating struggle in human history—the struggle of an ancient civilization with the culture produced by the industrial age. In this tremendous convulsion a new China is slowly being modeled. A new phase has opened with the ending of the latest civil war through an agreement between Nanking and Mukden—and, at the same time, the renewal of Communist out-bursts. The nature of the far-reaching struggle to achieve nationhood and the three great economic and geographical zones involved in it are described in the following article

By GEORGE E. SOKOLSKY

China has for so many centuries been a museum to the people of the West that such modern tendencies as capitalism, nationalism and communism are apparent incongruities from the standpoint of Western preconceptions. It is this museum idea of China which has to be combated by the person who wishes to understand what is occurring in that continent at the present time. For in China to-day there is a terrific struggle between a civilization and an economic life which, up to the beginning of the nineteenth century, were as suitable for Europe as for China, and a civilization and a culture which are definitely the product of the Industrial Revolution and are to-day beginning to mold a new China as it molded a new Europe and created America.

It is impossible to have any appreciation of China without a very clear view of the Chinese continent as it divides itself geographically and economically.

China is usually referred to as a country of 4,278,352 square miles, but this huge figure includes Mongolia, Tibet and Sinkiang (Chinese Turkestan) which, to quote Mr. Tsao Lien-en, in *The Chinese Economic Journal*, "are neither peopled nor directly governed by Chinese."

To China remains about 1,896,500 square miles, which is half the size of the United States. It must be noted that China does not politically recognize the loss of Mongolia and Tibet or the lessening of its authority and sovereign rights over Mongolia, Tibet and Sinkiang, and were China to-day sufficiently powerful to regain these territories by warfare, she would fight for them.

But the realities of the situation are quite clear. All that China actually controls and all that is effectively China, from the standpoint of administrative authority and of economic control, is an area of 1,896,500 square miles, and this includes all of China south of the Great Wall, some little territory outside of the Great Wall and Manchuria. This area may further be divided—from the standpoint of political and geographical relationships—into three zones.

Zone A—South China

Zone A may be described as the area east of the Tientsin-Pukow line and south of the Yellow River, which is definitely under the administrative authority of the Central Government at Nanking. This territory consists of approximately 500,000 square miles and is inhabited by more than 225,000,000 human beings. Through it flows the greatest artery of trade in China, the Yangtze River, and its economic capital is Shanghai, with other economic centers, such as Canton, Hankow, Tsingtao and Tientsin, as satellites. Its political center is Nanking.

Within this region is concentrated the whole of the modern industrialization in China. Its revenue from the Customs Service alone amounts to more than 66 per cent of the total. The city of Shanghai contributes about 46 per cent of the total revenue of the country. Of the fifteen cities in China which have a population of more than 200,000, twelve are in this zone. Even excluding the city of Tientsin, of 120 cotton mills in China, 96 are situated in this region, 59 of them being in Shanghai and its environs. With the exception of the Manchurian railroads, the Peking-Hankow Railroad, the Peking-Suiyuan Railroad and the small railroad in the Province of Shansi, all the railroads of China are in this region. All the ports on the Pacific, except Dairen in Manchuria, are here. Of Japanese investments in China, other than loans, amounting altogether to Y.1,257,382,360, Y.496,205,960 are invested in this zone, while the total investments in Peking amount only to Y.7,178,000. The remainder is in Manchuria, to which reference will be made elsewhere.

ECONOMIC EMERGENCE

One could go on indefinitely, indicating to what an extent Zone A has become a country on the verge of the twentieth century economically in most parts and well within the twentieth century on its sea coast and along the Yangtze River for nearly 500 miles from Shanghai to Hankow.

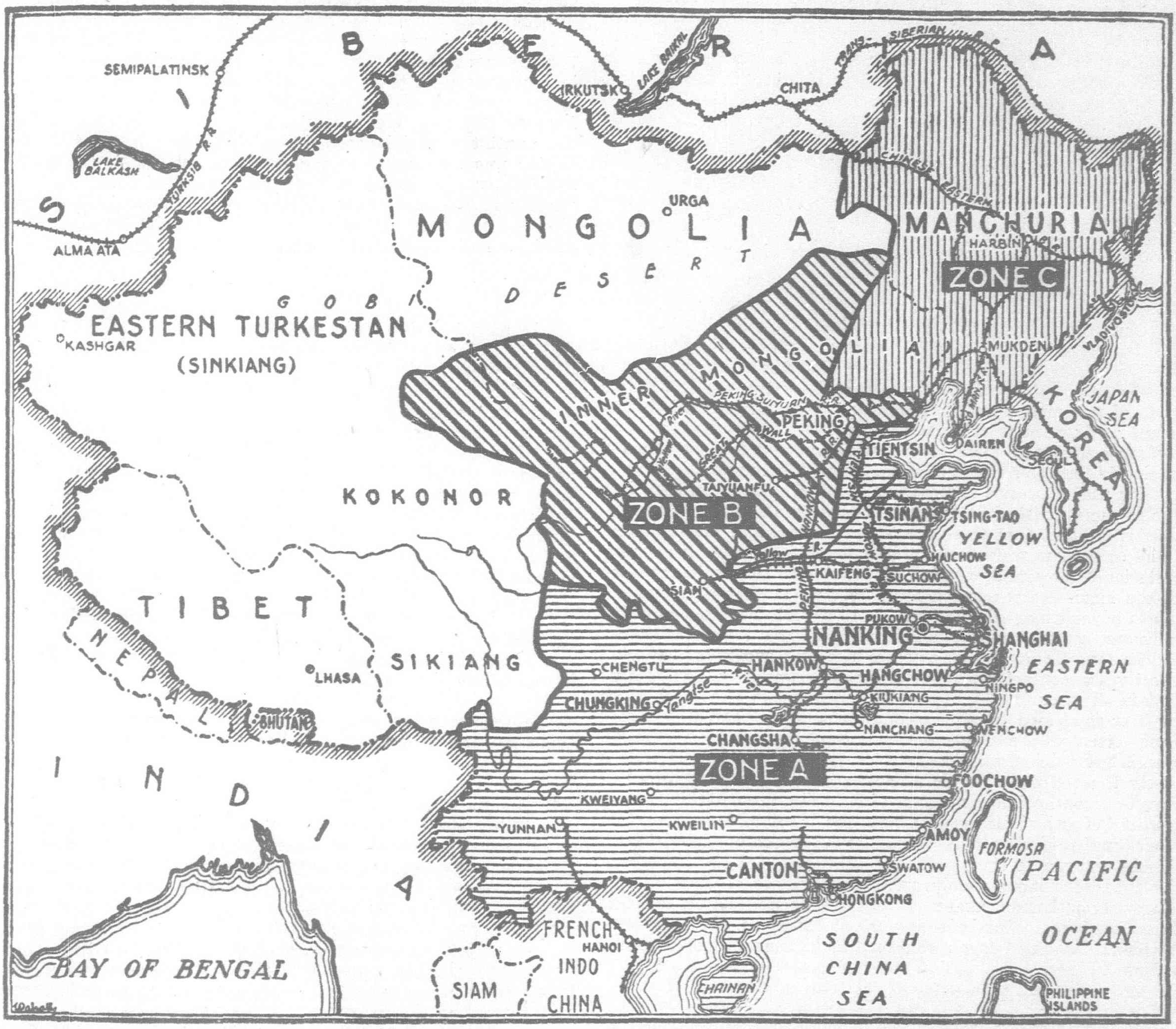
In this center the most fascinating struggle in human history is now being staged. A social system, which had been stabilized in the Sung dynasty, has felt the impact of Western social forms directly through European traders and missionaries since 1842. First with Canton as a center and later out of Shanghai, the Western person brought to China, at different times and in varying degrees, the full fruits of the Industrial Revolution. First came steam and then electricity; first came the Christian missionary, then the modern social worker and public health expert, and, in more recent times, the Russian Communist. At first the Chinese received new ideological concepts and utilitarian processes from the West passively, but later they sent thousands of students to all Western countries, who brought back the variegated political, social and intellectual ideals and movements to which the Chinese refer as "Western civilization."

It was in this zone that the largest number of foreigners, excluding Russians, actually settled and lived among the Chinese. It was in this region that from 1924 to 1927 the Russian Communists conducted highly effective political and social propaganda as part of a Communist revolution which had for its object the utilization of this area, its resources and man-power as a springboard of the world revolution. Here, for nearly a century, has been enacted the most intensified conflict between handicraft economics and modern industrialism, with no opportunity for slow evolutionary processes to work themselves out, because the products of Western industrialism and Western capitalism were imported whole and grafted upon ancient forms, not only by Westerners but by the Chinese themselves.

A ZONE OF CONFLICT

The impression of this movement upon the outsider is chaos and confusion. By the Chinese it is interpreted in terms of national revolution, which involves not merely the change in political forms

THE THREE GREAT ZONES OF CHINA



ZONE A—"All that is Effectively China"—"Within this Zone is Concentrated the Whole of Modern Industrialization." **ZONE B**—"Most of this Region is Mountainous, and when Crops are Bad the People Become Bandits or Join China's Numerous Armies." **ZONE C**—"Manchuria is Undoubtedly the Most Aggressively Modernizing of all Paris of China, Except the Shanghai Hinterland"

from a semi-religious empire, governed loosely and paternally by a ruling caste, stabilized by ancient laws and traditions, to a democratic republic founded on a composite of American and French democratic concepts, but even to the present constitutional forms based upon Sun Yat-sen's "Three Peoples' Principles" and the "Five Power" form of government, which is a combination of Western democracy, Russian sovietism and ancient Chinese forms.

This struggle has been accompanied by tremendous economic advances, largely on the part of the Chinese themselves, but also by civil warfare, in the course of which there have been much shedding of blood and even more destruction of property.

This struggle in its peaceful forms and in its warlike forms will have to continue until in this zone has been established a modern national State capable of maintaining itself economically through its won resources and by its own wealth; fully sastisfying the political aspirations of the people who inhabit it to find a place for themselves among the nations of the earth as an equal, and, at the same time, developing by education and a rising standard of living, and by the swifter tempo that industrialism produces, a new Chinese people different from the lethargic Chinese of two centuries ago, as the Chinese student of to-day is different from his grandfather.

Zone B—North China

That part of China which is usually termed "North China" is geographically the valley of the Yellow River, which includes the whole provinces of Kansu, Shensi and Shansi, and, for our purpose, only parts of Chihli, Honan and Shantung, for districts of the latter three provinces have already come within the scope of the twentieth century. The whole Yellow River Valley is about 600,000 square miles, the length of the river being roughly 2,500 miles. It is estimated that about 100,000,000 people live here, and they differ so completely from the China which we have described as Zone A, in climate, food products, social habits and economic conditions, that it is quite within reason that revolutionary and modern movements should affect the people there differently than in the south.

Whether this difference is merely one of tempo or of character, the future history of China alone can determine. Like the Southerners, the Northerners are principally agriculturists, but their entire agricultural technique is traditionally different from that used in the south. Whereas the whole of South China is very thoroughly canalized, in North China there are no canals and transportation is effected by exceedingly narrow roads which in Winter are almost impassable. Most of this region is mountainous and when crops are bad the people take to the hills and become bandits, or join China's numerous armies.

Deforestation of the country has resulted in alternate drought and flood conditions which have so severely affected the Yellow River that it changes its course from time to time. The disasters wrought by the vagaries of the Yellow River have caused it to be distinguished by the people of China as "China's Sorrow." But similar drought and flood conditions exist in all the valleys of the northern rivers, one of the results of which is that the rivers become dangerously silted up and at times are not even navigable.

But an even more severe result of deforestation has been the washing away of the top soil of vast areas, producing desert or semi-desert conditions which, in no small measure, are responsible for the almost permanent famine that faces the people of large parts of this area and which produce social and economic habits so wholly different from those which obtain in the prosperous and verdant south as to make it somewhat difficult to deal with the whole of China as a single economic or political unit.

By that I do not suggest the China should be split up into two or more political States, but it does become necessary to recognize the fact that there are these geographical, economic and social differences which cannot be ignored in any political interpretation of present-day China. Referring to this region as Zone B, the inevitable conclusion must be reached that it cannot for causes beyond immediate correction be expected to become politically and economically stabilized as rapidly as Zone A.

In Zone B we may find a people who have hardly been affected directly by contact with the industrial revolution. It is true that in Taiyuanfu, the capital of the province of Shansi, there has been some modern industry and that in one or two other places some cotton mills and arsenals have been erected. Nevertheless, it is, in my opinion, safe to suggest that modern economic life has barely touched these people who live, generally, in conditions of poverty and who face the horror of flood and drought with a concomitant of such social conditions as were described in the report on the famine in China by the American Red Cross Commission last year.

As one moves southward and southeastward in this region, the conditions more closely approximate those of Zone A, and conversely in the north and northwest they change into the nomadic tribal life of the Gobi and of the deserts of Turkestan, where, perhaps, Abraham, Isaac and Jacob would not find life as unusual as would a New Yorker.

A MENACE TO NATIONALISM

It is this region which most definitely menaces the rise of nationalism in China, for nationalism must be premised upon the modern industrial state, and the modern industrial state is unknown to these people. The struggle for mere life is so keen and desperate that any conception of service to the State is naturally beyond the pale of possibility. The people are kindly, hardy and represent a definite survival of the fittest in what would appear to be an overwhelming conflict with natural calamities. The constant movement of the desert southward increases from year to year and this gives rise to the purely technological problem of irrigation and reforestation, which is beyond the financial capacity of China at the present time.

In other centuries, where climatic and meteorological changes brought devastation to Turkestan, Mongolia and the most northern parts of North China, the people migrated in all directions. To-day for these people there is no outlet except into South China by warfare and into Manchuria by emigration. In 1923, 341,638 persons, of whom only 16.3 per cent were women, migrated from this Zone B to Manchuria; in 1929, 1,046,291 persons migrated.

Although the population of Manchuria has increased from a very small number of Chinese in the Ching dynasty, when Manchuria was closed to Chinese, to 27,000,000 people, of whom 90 per cent to-day are Chinese, it is impossible to move into Manchuria, with any satisfying rapidity, twenty or thirty million people from Zone B to relieve this area of its surplus population.

WAR BETWEEN THE ZONES

It is this geographical and population question which most completely explains the warfare between the rising National State in Zone A and the hordes of bandits and soldiers in Zone B. For it is quite obvious that no government can subsist in Zone B on the revenues collected there and that, therefore, it becomes increasingly necessary for those who control what there is of government in the provinces of this region, either to receive huge subsidies from the National State or to rise in rebellion against the National State until the subsidies are paid. This has been just as true when Peking was the capital as to-day when Nanking is the capital, and it is growing increasingly more evident that there can be no solution for this problem until the people of this region have been disarmed and have been placed completely under the control and dominance of the National State.

Zone C—Manchuria

Manchuria offers quite a different problem. This country consists of four provinces, namely: the three Eastern Provinces, which are completely under the control of Chinese, and the Japanese-leased territory and railroad zone, which is governed by Japan as a result of the Russo-Japanese War and the various treaties entered into between China and Japan.

Altogether Manchuria consists of about 350,000 square miles and has a population of 27,000,000, of whom 90 per cent are Chinese, while among the non-Chinese peoples are Manchus, Mongols, Buriats and Russians. To simplify our problem, we might include under Manchuria those regions in Mongolia which have not come under the control of Russia, particularly the Barga, into which Chinese immigrants are now pouring.

Manchuria, which, for the purpose of this article we shall call Zone C, is undoubtedly the most aggressively modernizing of all parts of China, except the Shanghai hinterland.

The Chinese Eastern Railway, which traverses the north, is more than 1,000 miles long; the South Manchurian Railway system, which is nearly 700 miles long, and the numerous Chinese and Sino-Japanese railways have opened up nearly the whole of this region to modern trade and to Western economic processes.

JAPANESE INVESTMENTS

The Japanese have invested, exclusive of loans and of the South Manchurian Railway, more than Y.750,000,000 in Manchuria in industrial and commercial enterprises. The South Manchuria Railway alone represents about Y.400,000,000 of capital investments.

A very aggressive policy of colonization has been embarked upon by both the Chinese and Japanese, land and agricultural implements being allotted to immigrants and farmers, and as the result of the experimental work of the authorities of the South Manchuria Railroad, Chinese Eastern Railroad and the Mukden Government, the most modern processes in agriculture and industry have been introduced. The Japanese have undoubtedly been a stabilizing force in Manchuria, which has in recent years, been, with one small exception, outside the vortex of civil war.

The peculiar international problems of Manchuria, arising from the presence of the Japanese and the Russians, make it advisable, under present circumstances, that Manchuria should be politically autonomous while recognizing the sovereignty of the National State with its capital of Nanking. This political formula has thus far been effective in keeping Manchuria out of the area of fighting while, at the same time, it has served to strengthen the National Government.

A PERIOD OF CONVULSION

In this evolution of a modern national State out of these three areas, there must be protracted periods of political convulsion which, in China, take on the form of civil war, particularly because in Zone B there are approximately 300,000 armed men who must look elsewhere for subsistence. Yet it is possible for Zone A and Manchuria to proceed with astonishing rapidity in the direction of a modern State while this struggle continues, as the economic history of both areas during the past decade readily indicates.

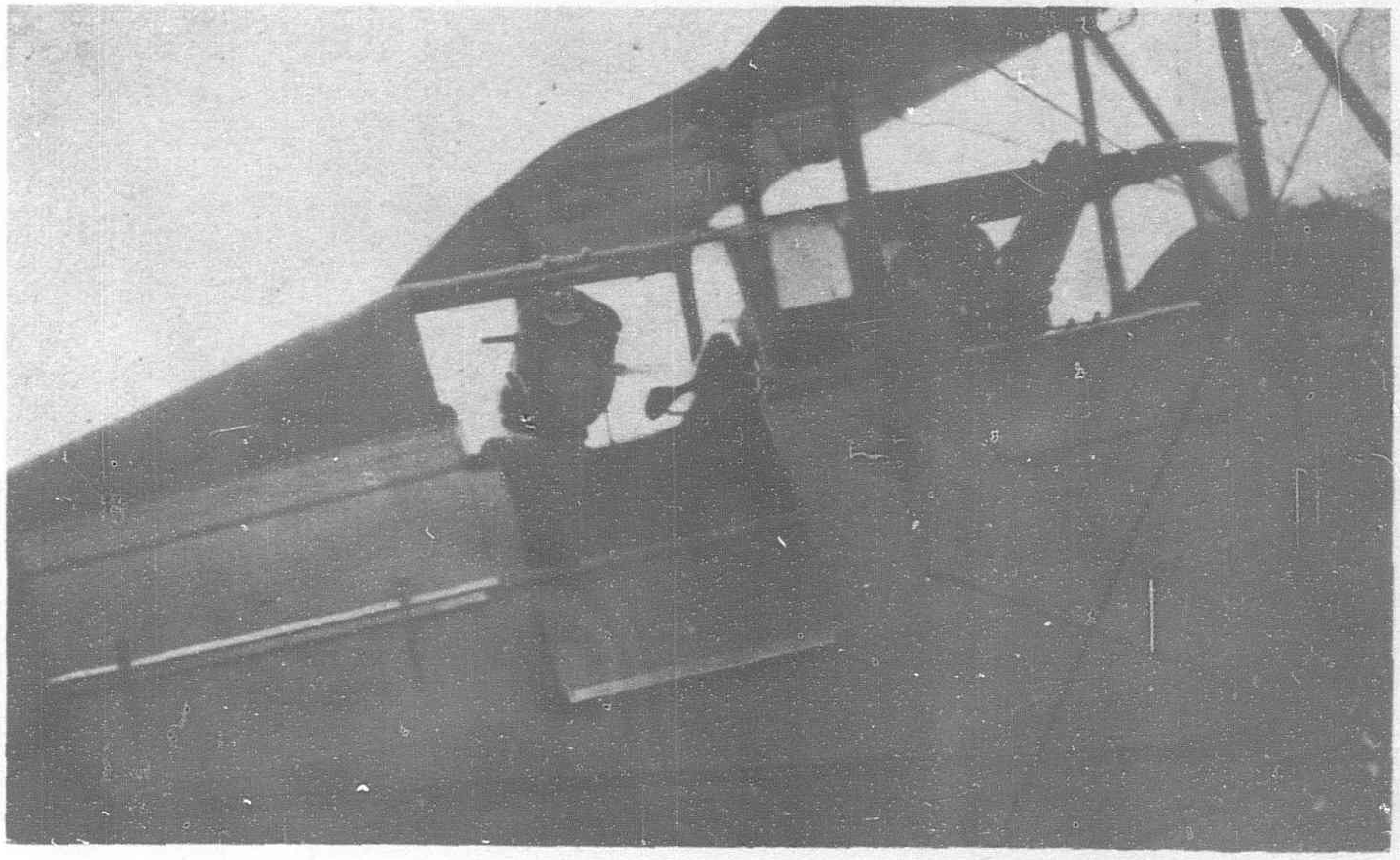
The question then arises politically as to what would be regarded as a peaceful and stabilized China. Shall we, for instance, judge China by conditions in 4,000,000 square miles, over a large

(Continued on page 34).

THE SKYWAYS OF ASIA

A Preliminary Survey Prepared by "The Far Eastera Review"

A new note shatters the age-old silence of the jungle. A Chinese farmer straightens out from his rice field to peer into the sky. A Japanese fisherman tosses imprecations aloft as a swelling roar disturbs his questing cormorants. In short, aviation has come to the Orient, bringing with it new ideas and new opportunities.



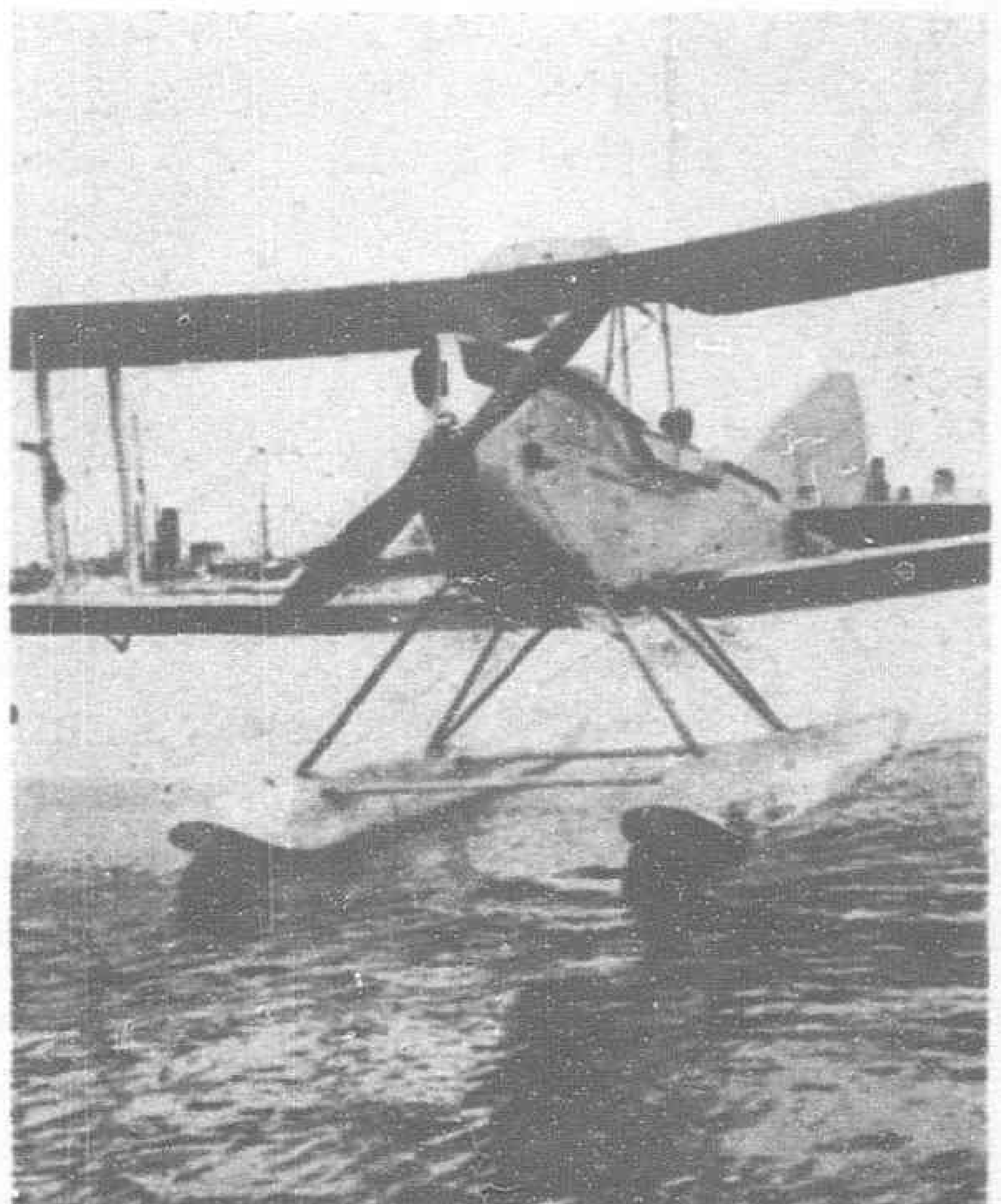
Marshal Chang Hsueh-liang Flying his own Moth de Luxe at Mukden, June 1930

From Rangoon to Mandalay, can be heard the drone of commercial aeroplanes heavily laden with passengers and mail. In Japan, aviation is no longer regarded as a military science; it has taken on a new lease of life. Awakened China has taken to the air and has thus added another feather in her cap which she has taken from the plume of Western civilization.

Air lines join Chosen (Korea) with Japan and China. Siam, with its widely scattered centers of civilization, is preparing for rapid development of air-transportation. Persia, a country of great distances and few highways, is looking to air-craft to accomplish what the automobile and paved roads have accomplished for other countries. In the Straits Settlements seaplanes churn the waters where for centuries only junks held sway. Singapore boasts of the only light sea-plane club in the world.

The Orient has turned air-minded, thereby opening a new and extensive field for the sale of air-craft and equipment. Aeroplane manufacturers of the world are looking to the countries east of Suez for a rich harvest in this class of trade. Stern competition has developed with America, Britain, France and Germany striving to gain footholds in the business of supplying the Orient with the means of flying.

With a realization of America's quick dominance of the automobile trade fresh in mind, other countries are moving rapidly to prevent a repetition in the aeroplane industry. But American manufacturers have been fully alive to the possibilities in the Orient. At least six American air-craft corporations have actually representatives in the field demonstrating American 'planes and soliciting business. Other companies have started correspondence with Oriental trade representatives to sound out market conditions, whilst the British, French and Germans are not permitting the grass to grow under their feet. British, French and Dutch are rapidly developing the Southern Asiatic air routes to the Far East and Australia while the Germans and Russians are concentrating on the Northern approach to China and Japan.



Moth Seaplane, used by Chinese Navy at Shanghai

Across the Behring Strait

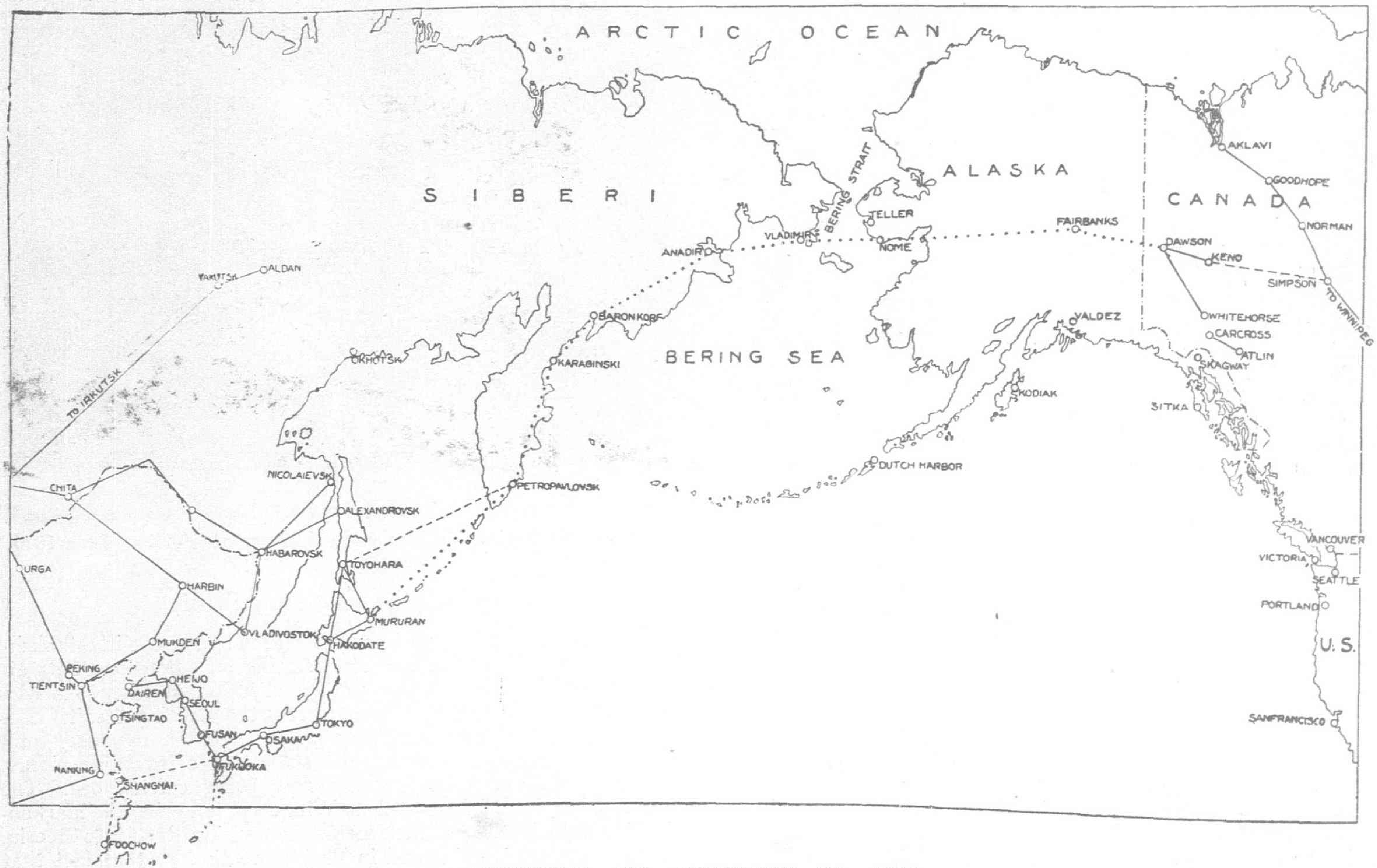
The United States, not to be left behind by Europe in establishing air connections with Asia, is planning an extension of its air mail lines which will link the country with Canada then to Alaska and on to Siberia and the Orient across the Behring Strait. The American Post Office authorities have made the necessary preliminary aeronautical studies and submitted a favorable report, but additional investigations are now being carried out. The line would be from Minneapolis to Winnepeg, following the Mackenzie River into Alaska and then across the Behring Strait into Siberia. Further interest is evidenced in Pacific aviation by that fact that the House Naval Committee is to select the site of a new naval air base on the Pacific Coast to cost $5,000,000.

Present air mail visions of United States postal officials may be described without exaggeration as grandiose.

Assistant Postmaster-General Glover, who recently returned to Washington from consultations with Canadian postal authorities, describes the proposed air mail hook-up between Winnipeg and Minneapolis as a link in a natural trade route to China and Japan, *via* existing Canadian services from Winnipeg up the Mackenzie River, through Alaska and across Bering Strait into Soviet Russia.

This Canadian territory, he states, is now being flown practically as far north as the Arctic Circle. The leg between Winnipeg and the Twin Cities will take a letter mailed at Aklavik, almost within a snowball toss of the North Pole, to Buenos Aires within three weeks, whereas a letter going by dog sled, railroad and steamship would take nine weeks to make the trip to South America. The hook-up with Winnipeg will also make direct connection with

Training Moths in use at Chinese Naval School, Shanghai, April, 1930



AMERICA'S AIR APPROACH TO ASIA

The U.S. Postal Authorities have Reported Favorably on Establishing an Air-Mail Route to the Far East Using the Canadian air routes from Winnepeg to Dawson, then across Alaska and the Behring Strait to Siberia, linking with the Soviet lines to Europe and the Far East

the Canadian service to the west from the Manitoba capital to Calgary and Edmonton. This service will later be continued west to Vancouver, as soon as the way is lighted.

Glover does not regard the American-Japan air route as improbable. "It is not an improbable route by any means," he declares. He adds that: "With the contemplated trans-Atlantic service from Europe to the shores of the United States and direct connection by air from the Atlantic to Chicago, the Twin Cities to Winnipeg and Northwest Canada to the Far East, mail from Great Britain to the Orient will reach China and Japan two weeks sooner than by present methods of transportation.

"The post office departments of both Canada and the United States at the recent conferences have given the proposition careful study and do not intend to stand idly by and permit this opportunity for a direct hookup with the Far East to be supplied by any other countries than those of the United States and Canada."

Glover further stated that great progress has been made in civil aviation in Canada and that figures showed that the number of passengers carried on Canadian air lines is increasing all the time. The planes leaving Winnipeg flying at night for Regina, Medicine Hat, Calgary and Edmonton are all carrying full passenger loads, he said. He declared that such was not the case in the United States, where but few persons embrace the opportunity of flying by night.

Canadian Railways Facilitate Pacific Air Mail

The Canadian railways which have already contributed so largely to the development of rapid trans-pacific communications have definitely entered the aviation arena in a rail air hook-up destined to become of the greatest importance to future Far Eastern communications.

By the endorsation of the Canadian Government, in a recent Order-in-Council, the Canadian National Railways has been enabled to participate with the Canadian Pacific Railway, Western Canada Airways Ltd., and the Aviation Corporation of Canada in the formation of a large company to be known as Canadian Airways Limited. The Canadian National is purchasing 10,000 shares of the capital stock of Canadian Airways Limited, an investment of $250,000. The Canadian Pacific Railway is taking a similar interest.

The size and importance of the merger is indicated to some extent by figures relating to the Western Canada Airways. Over 2,500,000 miles had been flown so far by the planes of this company, operating in all sections of the country from Ontario to the Pacific Coast and far north in the Arctic Circle, one having visited the magnetic North Pole this year. The activities included also transportation of over 40,000 passengers, as well as mail, express and freight services.

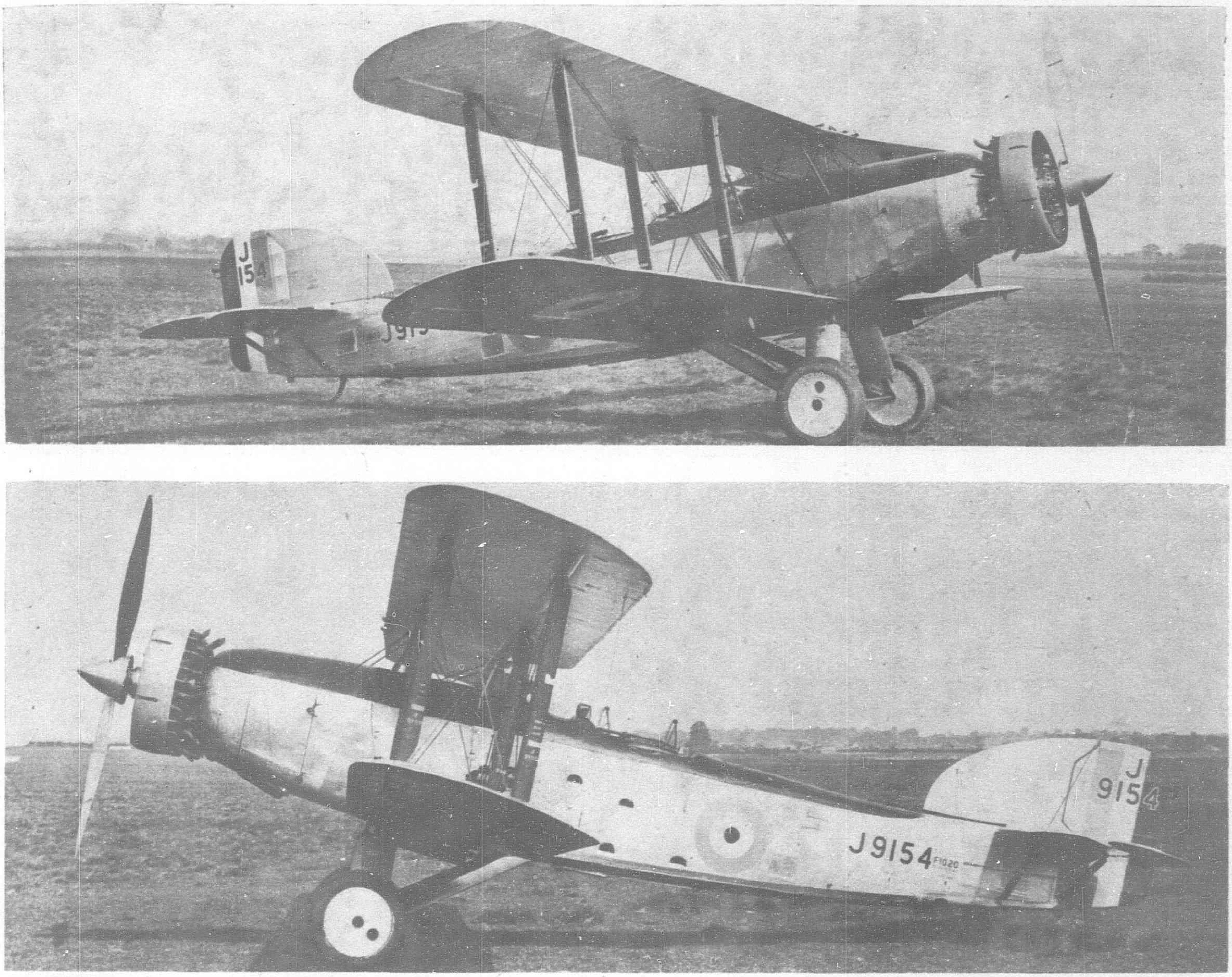
Sir Henry W. Thornton, of the Canadian National Railways, and E. W. Beatty, President of the Canadian Pacific have consented to become joint vice-presidents in the new commercial air enterprise.

American Aviation Expert for China

The U.S. Department of Commerce, keenly alive to the possibilities of China as a market for American aircraft, has appointed Mr. E. P. Howard, a special technical aviation expert with the rank of Assistant Trade Commissioner, to the Commercial Attache's Office in Shanghai. Mr. Howard is an expert aviation technician, flying instructor, airport constructor and organizer of aviation schools. For the past two years he has filled the post of aircraft and engine inspector in the Bureau of Aeronautics in the Department of Commerce and his appointment to China was prompted by a desire on the part of the Commerce Department officials to aid the Chinese with their aviation problems.

Japan Forging Ahead

Foreign air-craft companies have had a difficult task in their efforts to break into the aeroplane industry in Japan. For a long



Two Seater Davy Fighting Bomber: Armament, Two Vickers Guns, one Fore and one Aft. Bomb Rack Installation Under Lower Wing

time Japan has sought to build up an aeroplane industry of their own. Japanese companies have hitherto constructed flying machines on British and French lines with varied success. Recently the Japanese Air Transport Company, one of the largest commercial operators in the Orient, broke away from the use of Japanese-made planes and ordered six Super-Universal Fokker machines F-7-SM's, equipped with Wright Whirlwind motors, from the Netherlands. These Fokker machines are being used in a passenger and mail service between Japan, Korea and Kwangtung and as soon as permission from the Chinese Government is obtained the service will be extended to Shanghai.

Japan has not made very great strides in the development of commercial aviation as the aeroplane has been regarded as a weapon of attack and defense. However, the Japanese Government has now relinquished this view and Japanese commercial flying is expected to set a pace second to none in the Orient. The air-mail already runs between Osaka and Tokyo and Osaka and Oita and from Tokyo to Sendai. This service has been extended

Fairey 3F. for General Purposes Aircraft at Shanghai Aerodrome; Engine, 500 h.p. Napier

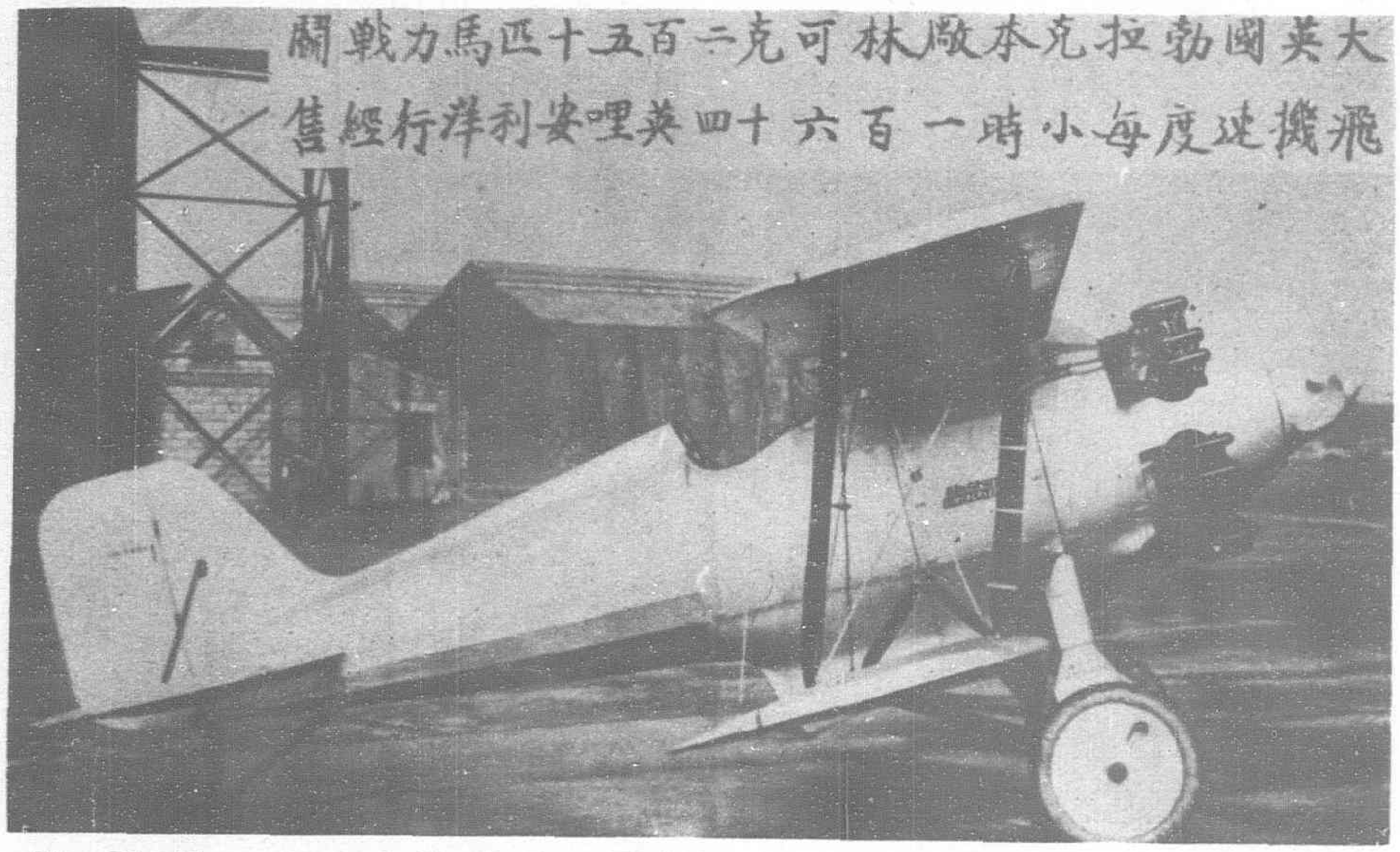
Assembling Moths Sold to Mukden Air Force School, June, 1930

to Seoul and Dairen. The Japan Air Transport Company uses about 40 Fokker planes.

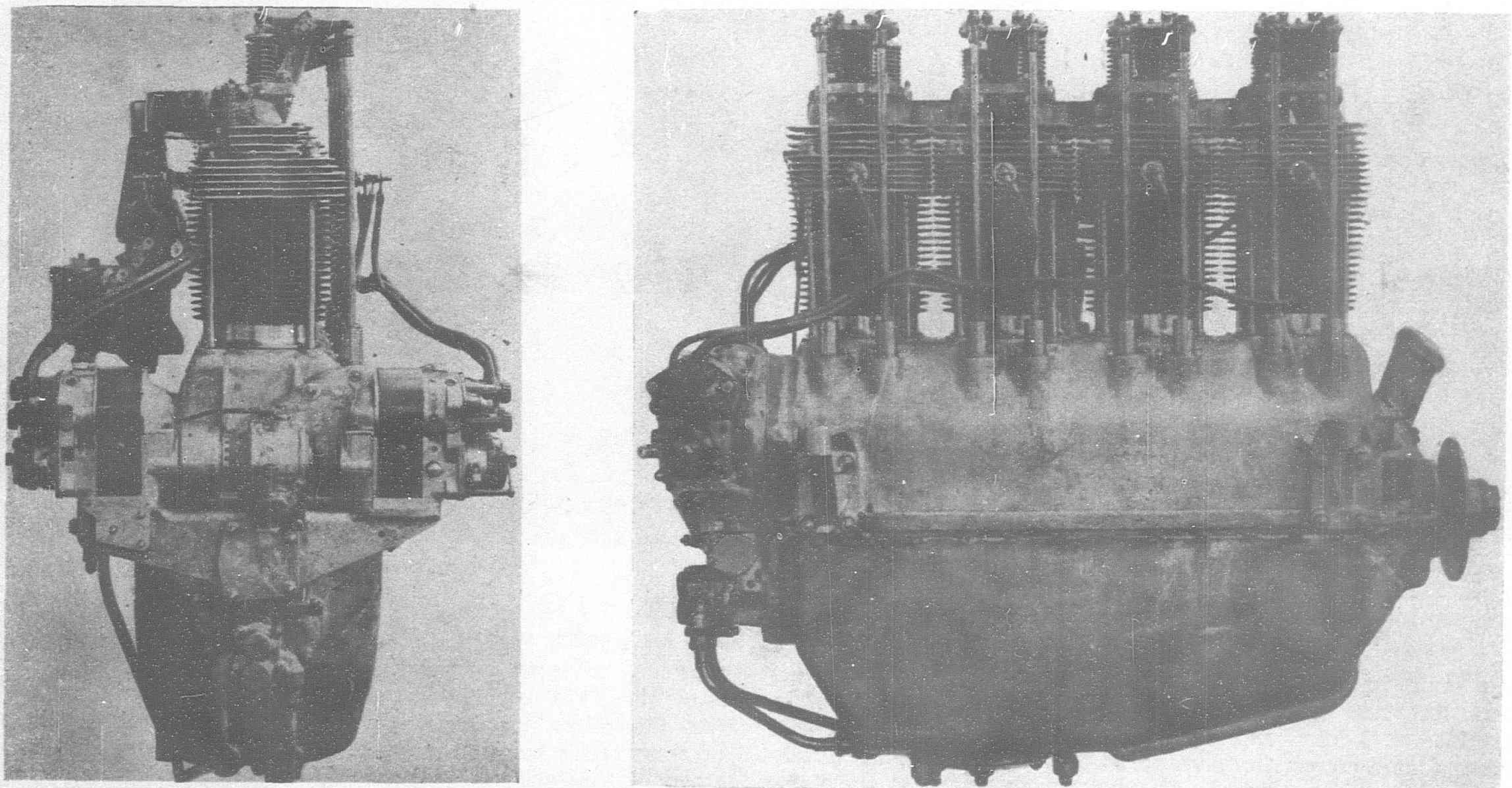
The latest reports from Japan state that the experimental air flights between Tokyo and Shanghai *via* Fukuoka will be concluded by April when it is hoped that a regular service will be started. The Ministry of Communications has also proposed to the Japan Air Transport Company that it open a regular service between Fukuoka and Formosa this spring. In the experimental flights carried out by the company the route flown was from Tachiari to Taihuku *via* the Loochoo Islands. A big Dornier seaplane also made the trip from the Najima base to Tamsui. The time required for the flight is estimated at seven to eight hours.

Great interest is being displayed in Japan over the arrival of the Giant Do X, the world's largest seaplane acquired by the Japanese Navy. The boat was built by the Short Brothers Aircraft Works of England and is equipped with Rolls-Royce engines attaining a speed of 150 miles per hour. Although big enough to carry 200 passengers, most of the space will be utilized for legitimate naval purposes.

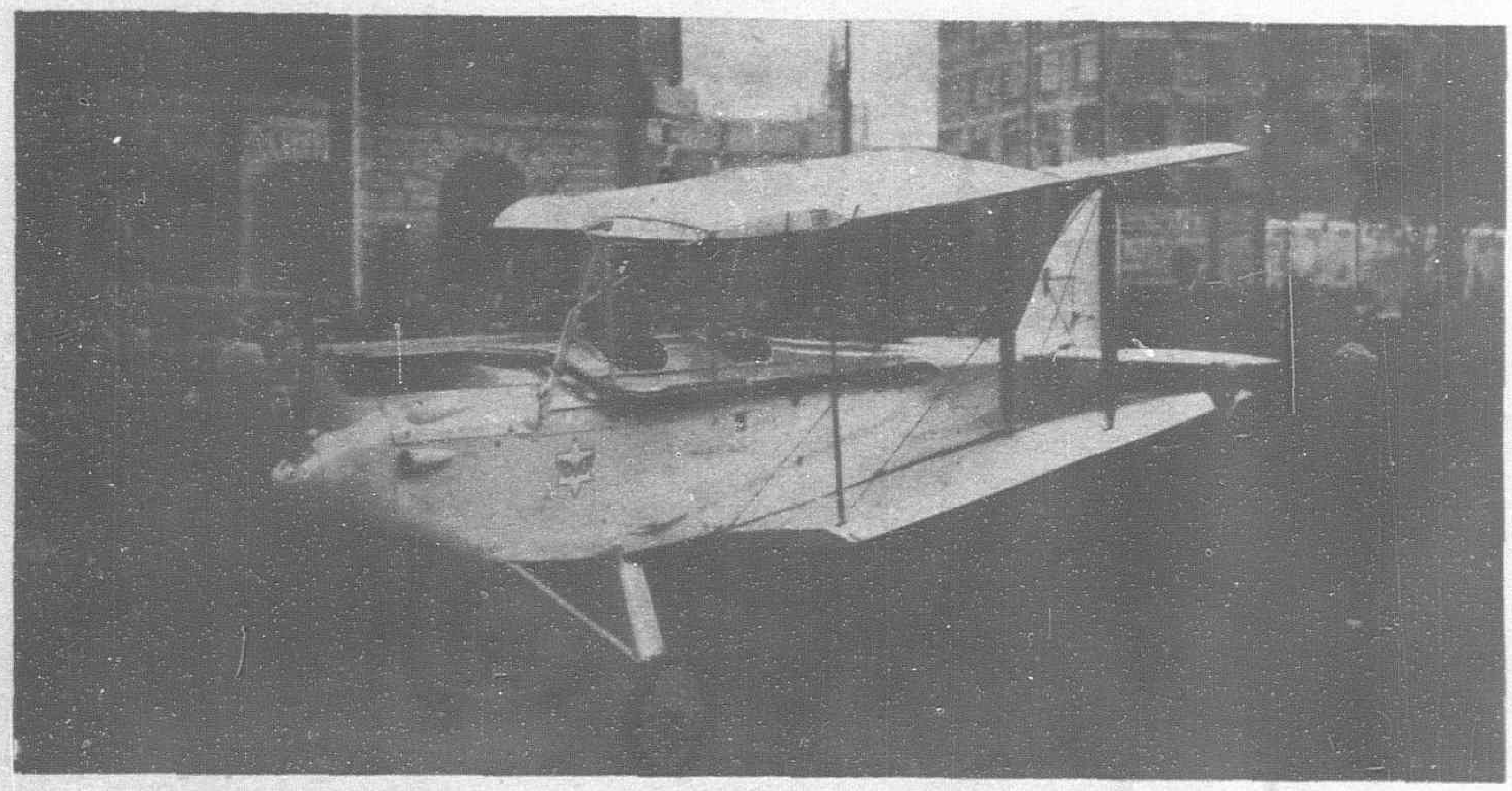
Extensive government aid is being given to commercial flying in Japan. During the next 11 years the Japanese Government contemplates subsidizing the air-craft industry to the extent of approximately Gold $10,000,000. Radio-beacon stations have been erected at Tokyo, Hakone, Nara, Osaka and Fukuoka. Route marks have been placed at eight places between Tokyo and Fukuoka. Five meterological stations, to assure accurate weather forecasting, will be placed in operation. The first one was established at Onogawa.


大英國勃拉克本厰林可克二百五十四馬力戰鬭
飛機速度每小時一百六十四英哩安利洋行經售

The Blackburn Lincock Single Seat Fighting Pursuit Aircraft: Engine, Armstrong Siddely 260 h.p. Lynx; Armament, Two Vickers Guns Firing Forward Through Propeller



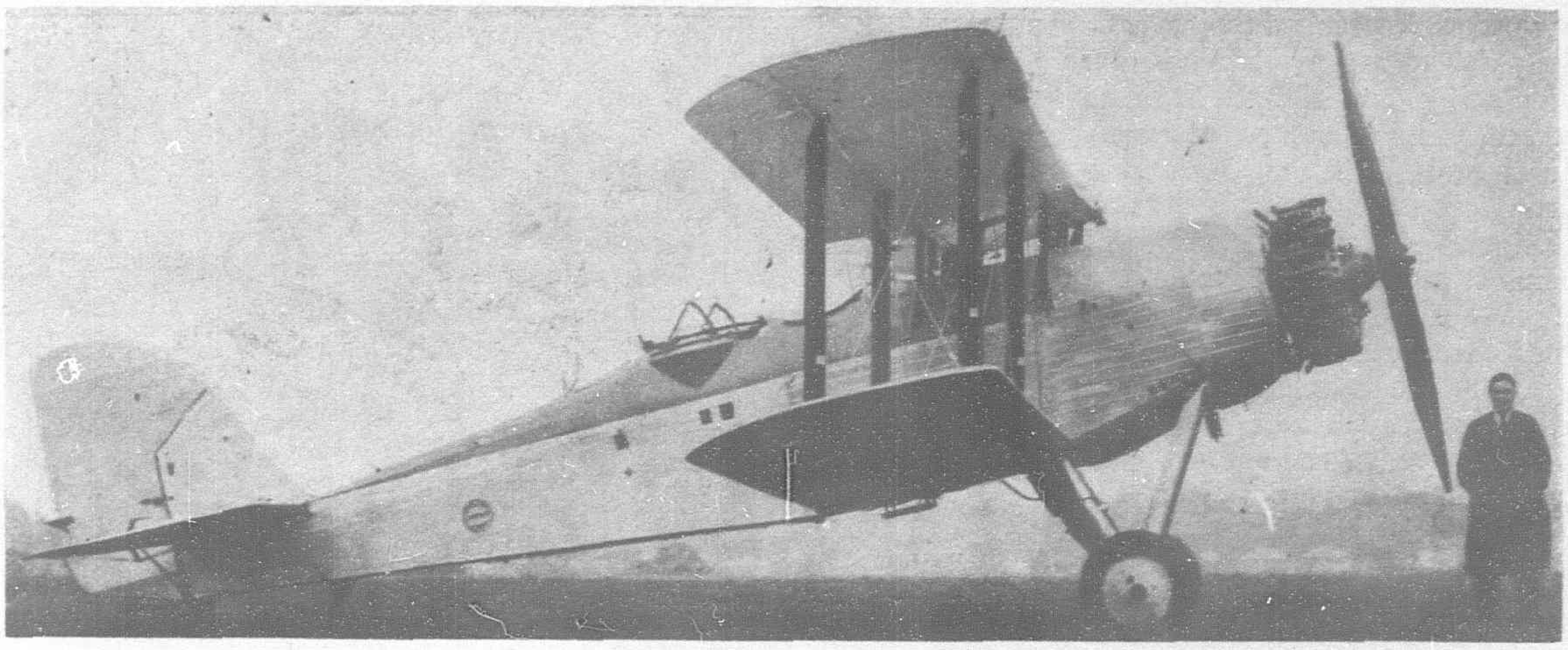
The Famous D. H. Gipsy Engine: Gipsy I, 100 h.p.; Gipsy II 120 h.p.



The First of 61 De Haviland Moths Sold in China since March, 1929; Exhibited in the Streets of Shanghai

Tokyo's New Air Port

At present there are 42 civil airports and landing fields in Japan. Tokyo's new airport, situated less than half an hour from the heart of the city, is nearing completion and is expected



Westland Wapiti Biplane, Designed at the Westland Aircraft Works, Yeovil, now Touring China

Vickers "Vespa" Army Co-operation Aircraft, Engine, Bristol Jupiter

to be put to use by April. The aerodrome is located at Haneda, on Tokyo Bay, at a point between Omori and Kamata, much more convenient to the capital than is Tachikawa, the present commercial airport for the city, which is about an hour and a half distant by motor. The Haneda field will have an area of 133 acres and when completed in 1932 it will be the largest civilian aviation field in the Orient. The Government is spending about Y.4,000,000 to establish this air field. Of this sum about Y.3,000,000 was devoted to purchase of the land. The remainder is being spent upon a lighting system, the construction of an observatory tower, communications offices, customs offices and other equipment. A concrete runway 400 meters long will also be laid down. Half of the ground will be leveled and equipped to such an extent that the field may be put to use by the end of next March. More than 200 workmen are now being employed leveling the ground and laying turf. As soon as the airport is completed all the civilian aviation equipment now at Tachikawa will be moved there and business offices will be established there by the Japan Air Transport Company. The leveling process began at the north end of the field and is progressing southward. A mixture of clay and sand is being used as a base, this material being brought to the site by boat, *via* the Ebi river upon which the western end of the field fronts. The surface of the field will be raised two feet with clay and on top of this turf will be placed to prevent dust in dry and windy weather. Hangers and other facilities for seaplanes will be established at the western edge of the field where it touches the Ebi River. The other buildings will be erected at the southern edge and the concrete runway will stretch from south to north. The Tokyo Prefectural Government is building a road from the field to connect with the Tokyo-Yokohama highway, which is only a short distance away. The connecting road will be 24 feet wide over most of its length and 35 feet at the aviation field.

Linking With the Soviet Lines

The Japanese are preparing to link up with the Soviet air lines in the north, by building another large airfield at Toyohara in Saghalien. The landing field will be 180,000 tsubo in area and will have two runways of 2,000 meters in length. The proposed airfield is situated a short distance to the southwest of Toyohara station and negotiations for buying up the land have already been undertaken. The Chosenese Government is also making extensive plans. Airports are being laid out and eight land-marks have been erected to guide flyers across country from the Manchurian border.

Japanese Trans-Pacific Airships

It is interesting to note that shortly after the American plan to span the Pacific with an airship service was announced, Japanese promoters started to organize a company in Tokyo to operate a similar service from Japan to America. Four huge airships on the style of the Graf Zeppelin were to make regular trips carrying passengers at G. $1,500 per head. The capital of the Company was to be Y.150,000,000. Undoubtedly the financial depression, the necessity of conducting investigations and studies and negotiations with the American Government for landing privileges etc., will postpone the project indefinitely. The Japanese authorities are inclined to the view that the plan will not assume concrete shape.

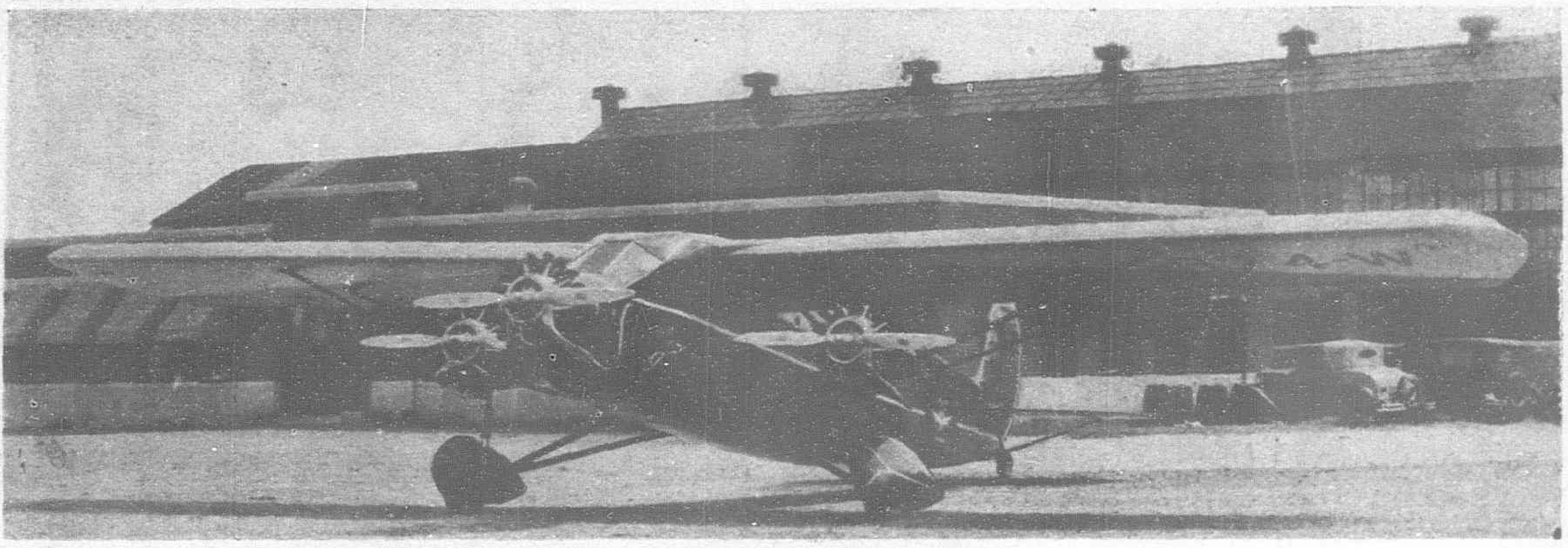
Progress in Indo-China

Until the end of 1929, aviation in Indo-China was more or less in suspension, governed by the military necessities of the moment. Landing fields and points of assembly were not coordinated, except from the strategic point of view, and it was not until the recent rapid development of Far Eastern aviation, that the question of civil aviation came to the fore.

Recent long-distance flights have made it apparent that there is a possibility which Indo-China must not overlook, owing to her favorable geographical situation in the direct line of aerial travel between Europe and points in the Far East. The Government has consequently prepared an extensive aerial development program.

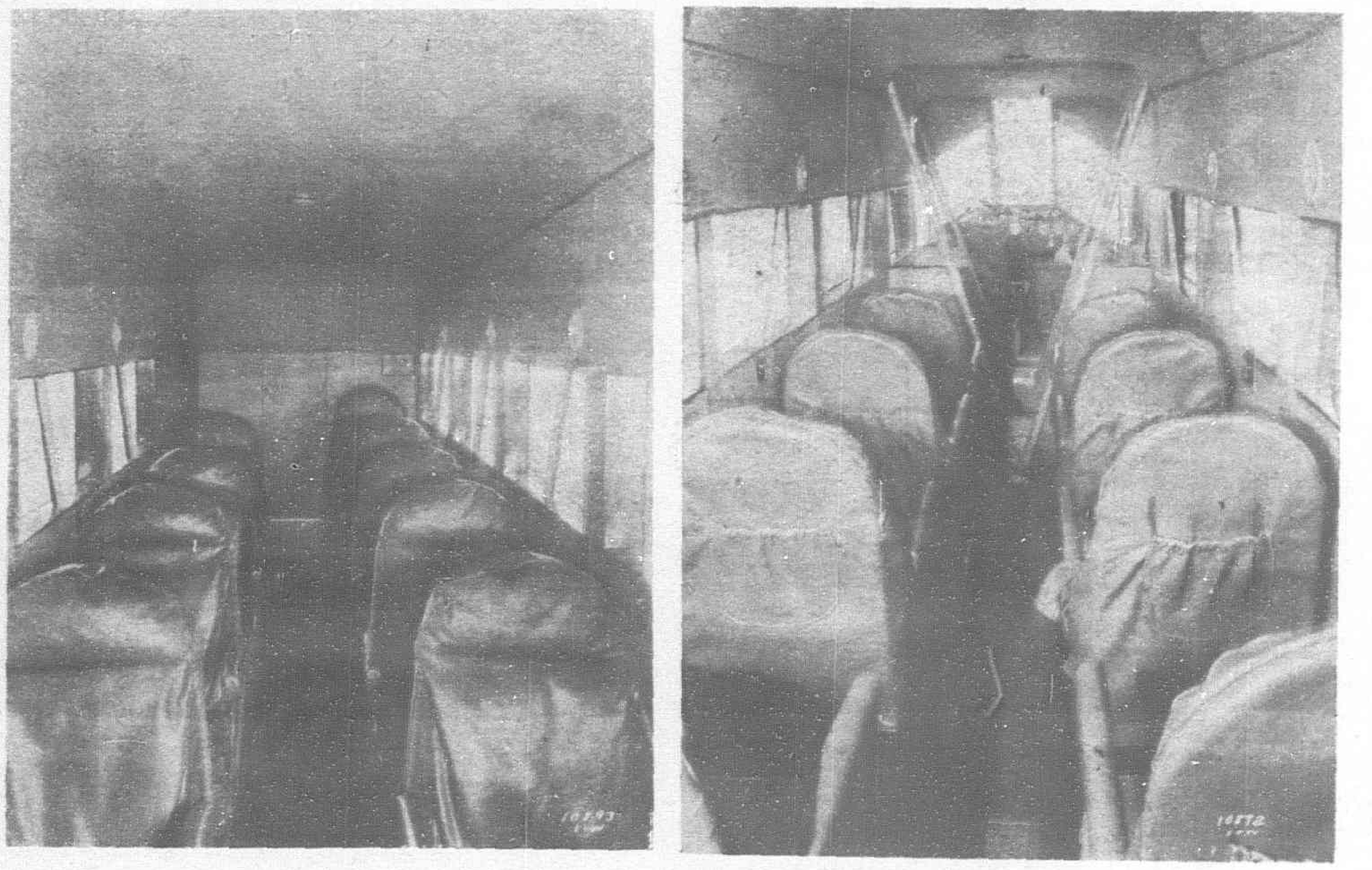
The Vientiane-Vinh Line is conceived as the Indo-China section of the grand international trunk line from Europe by way of Syria, Mesopotamia, Persia, India, Burma and Siam, and in so far as the French are concerned, is the direct link between Paris and their important colonial center of Hanoi. Ten landing places will be prepared along this section, with special provisions at Lak Bao for the difficult passage across the Annamese Mountain chain, which traverses the country in a longitudinal direction. The two terminii of the section, Vientiane and Vinh, will be equipped with full regard to the needs of three-motored machines which it is expected will be the type most favored for the long flight over two continents. Vientiane already has a vast aerodrome, measuring 1,000 meters square, which will be usable during the whole of the year. That at Vinh is being prepared, work there being now pushed ahead.

For the Hanoi-Saigon line, which is the ultimate aim of local Indo-China aviation, (connecting as it does the chief centers of commercial, industrial and administrative importance *en route)* two aerodromes are being prepared at the two ends, replacing the makeshift ones already in existence at Bash-Mal and Tan Son Nhut. A supplementary route between Saigon and Phankrang will enable machines to avoid the fogs of the South Annam coast at certain times of the year. The scenic route along the Mekong River offers an alternative to the more direct land line between Hanoi and Saigon during the monsoon season.



Stinson Tri-Motor 10 Passenger "Airliner"

The international trunk line has been materializing. A French Company, styled the Asia Air Company, having come forward with a definite project which they have put into practical form with a regular line, which, since October 1, has been in operation between Saigon and Bangkok, where it picks up the French mails brought from Europe by the Dutch trunk line. The same Company has brought out a high-powered seaplane which will inauguarate a regular service by sea between Saigon and Calcutta. Another French subsidized organization called the Orient Air Company has projected a fortnightly service between India and Vinh, by way of Rangoon and Pitsanolouk. Simultaneously with the inauguration of this line the service which the Compagnie Air-Orient at present operates between Marseilles and Baghdad by way of Beirut, will be extended to Karachi.



Interior of Stinson Tri-Motor 10 Passenger Airliner

Looking Aft

Looking Forward

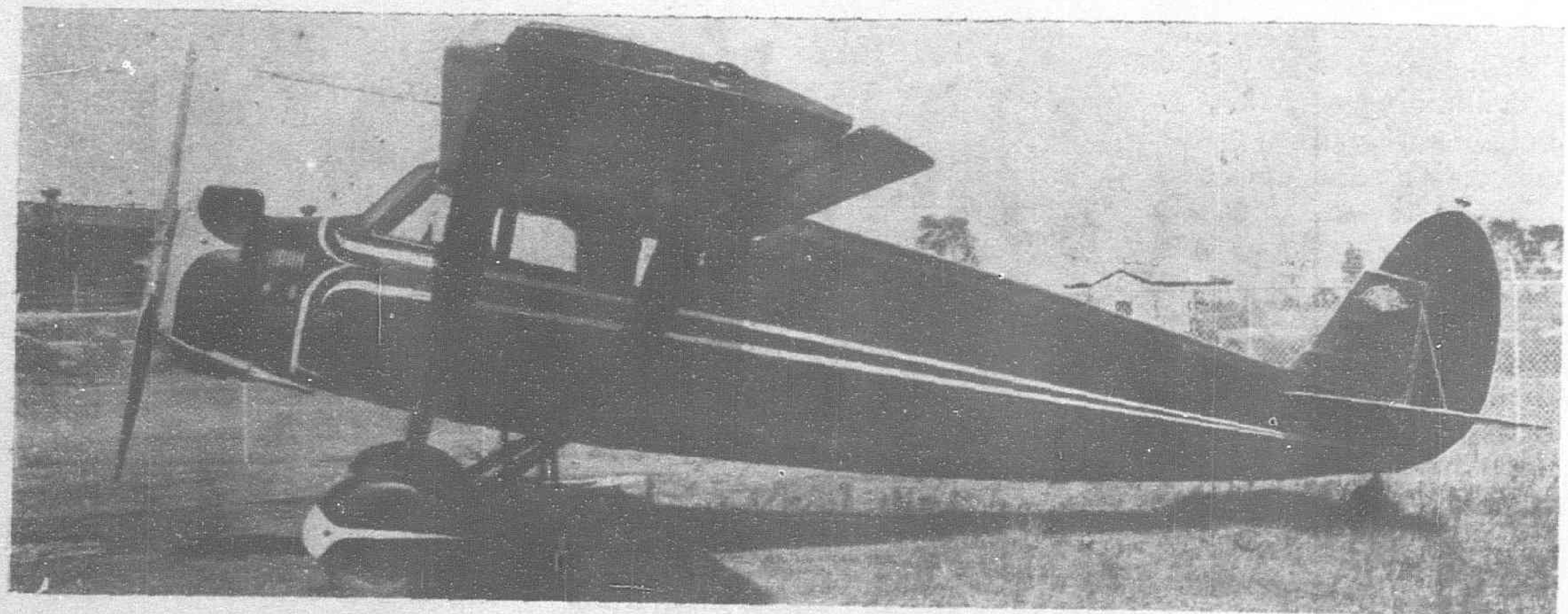
With regard to the Calcutta-Saigon section of the service, Colonel Glaiz, Agent-General of the Compagnie Air-Orient in the Far East, was in Calcutta recently to make arrangements for this service. C.A.M.S. 55 twin-engined flying-boats, similar to those used on the Marseilles-Beirut section, will be used, and they will operate from a station on the Hooghly, probably near Ishapore, and the hanger will be built on the shore with a slipway.

When the complete service is in operation, mails and passengers will travel by flying-boat from Marseilles to Beirut and thence to Baghdad and Karachi by aeroplane. At Karachi passengers and mail will transfer or be transferred to a train for Calcutta. On the Calcutta-Saigon section the intention is to carry mail at the outset, but when experience has been gained passengers will be carried. The journey in either direction on this section will take about three days. The purpose of the Company ultimately is to extend the service to China and Japan.

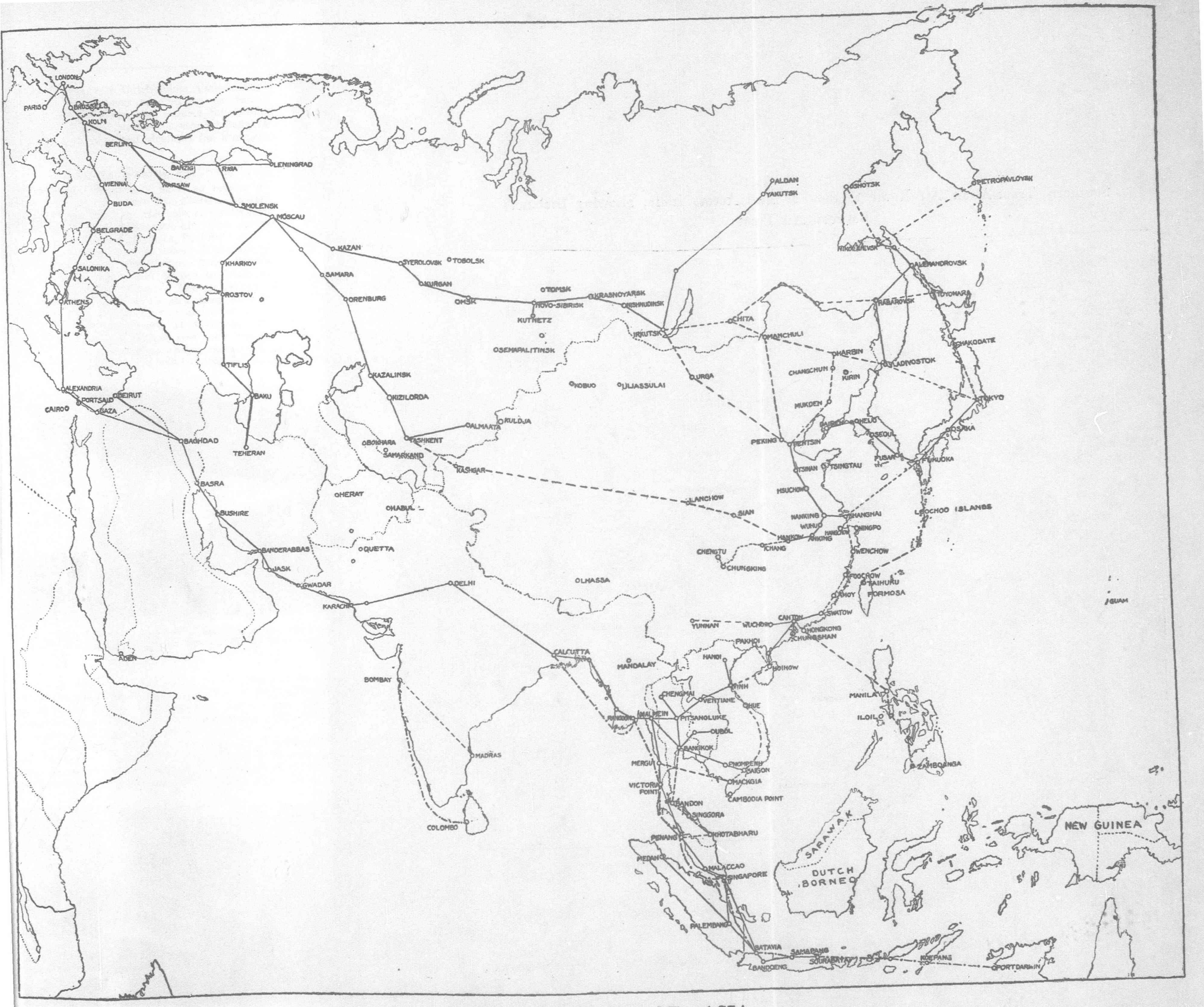
The French inaugurated on January 3, a direct air-service between Paris and Saigon in Indo-China, with a three-engined monoplane on a twelve day schedule. A record flight between Paris and Saigon was carried out in November by French aviators who left Paris on November 8 at 1.15 a.m. and arrived in Saigon on the forenoon of the 13th. This new service will prove a distinct boon to Indo-China, cutting down the time of 26 days by steamship to about ten days by air.

Siam, the Skyway to the Far East

Siam has taken readily to aerial transportation. Airports have been built at Donmuang, Chieng Mai and Ubol. These are equipped with customs facilities and other necessities for civil air-craft. The Siamese Government and the people are deeply interested in aviation and official assurances have been given of fullest co-operation with foreign air-transport companies desiring to operate in Siam. Special arrangements have been made for the transportation of airmail to Europe. Over this land of temples and jeweled idols, where the most dignified method of travel is by elephant-back, multi-motored 'planes of the Royal Air Navigation Company of the Netherlands speed on their way between Holland and the Dutch East Indies.



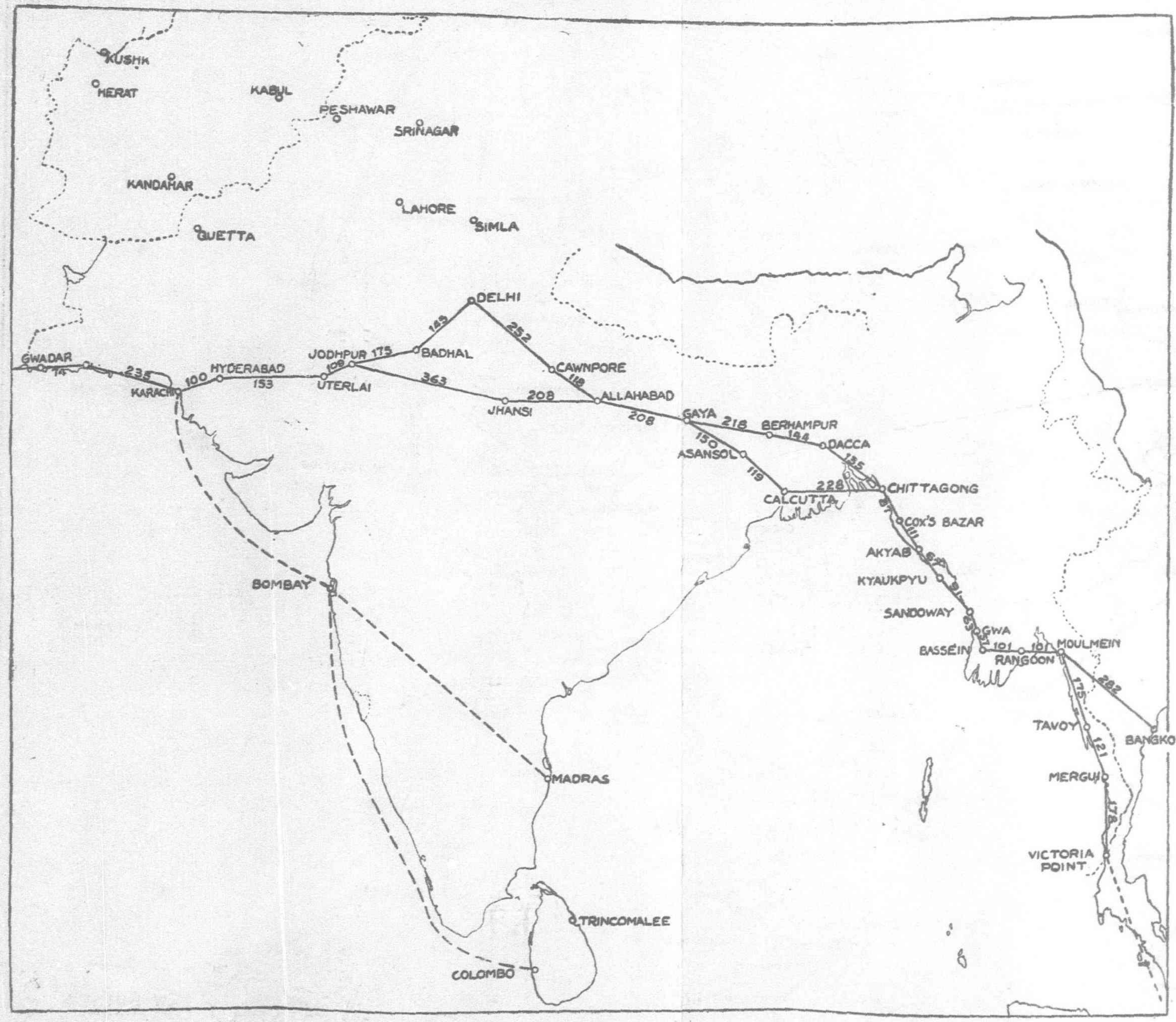
Stinson Junior Four Place Passenger Plane: Similar to Large Six Place Stinson Senior Seaplane to be used on Hankow-Chungking Run of the China National Aviation Corporation



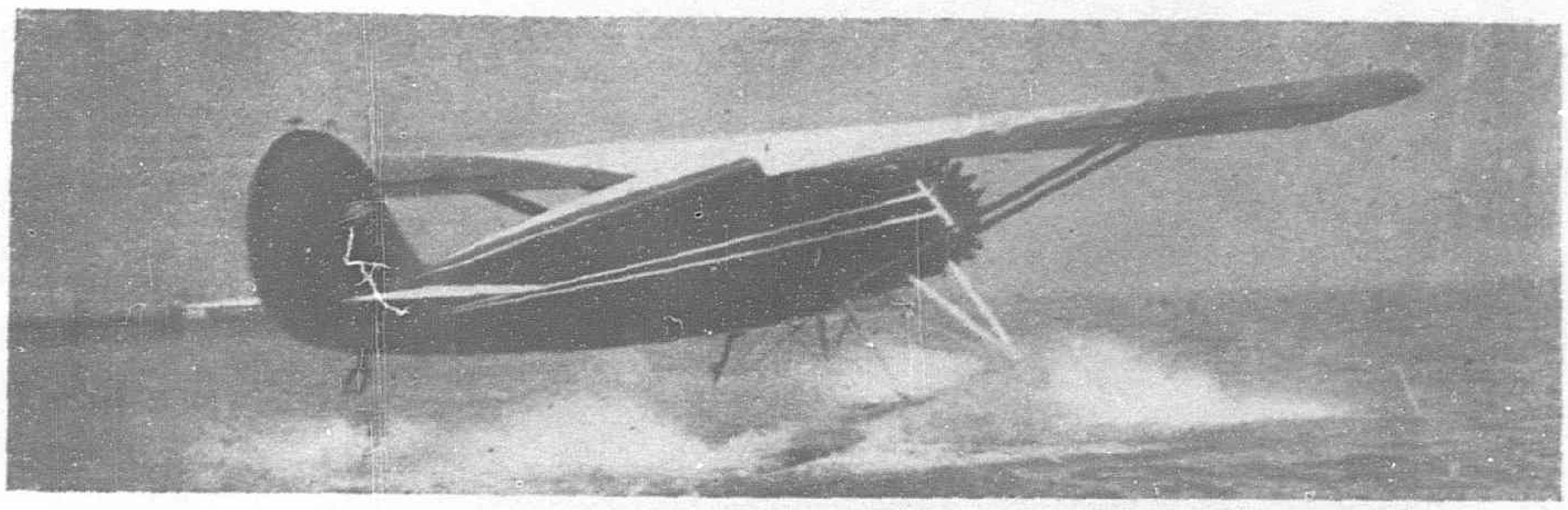
THE SKYWAYS OF ASIA

Sketch Map Showing Services in Operation——and Projected Lines........

Southern Trans-Asian Air Route to the Far East Across India, Showing Distances Between Air Ports



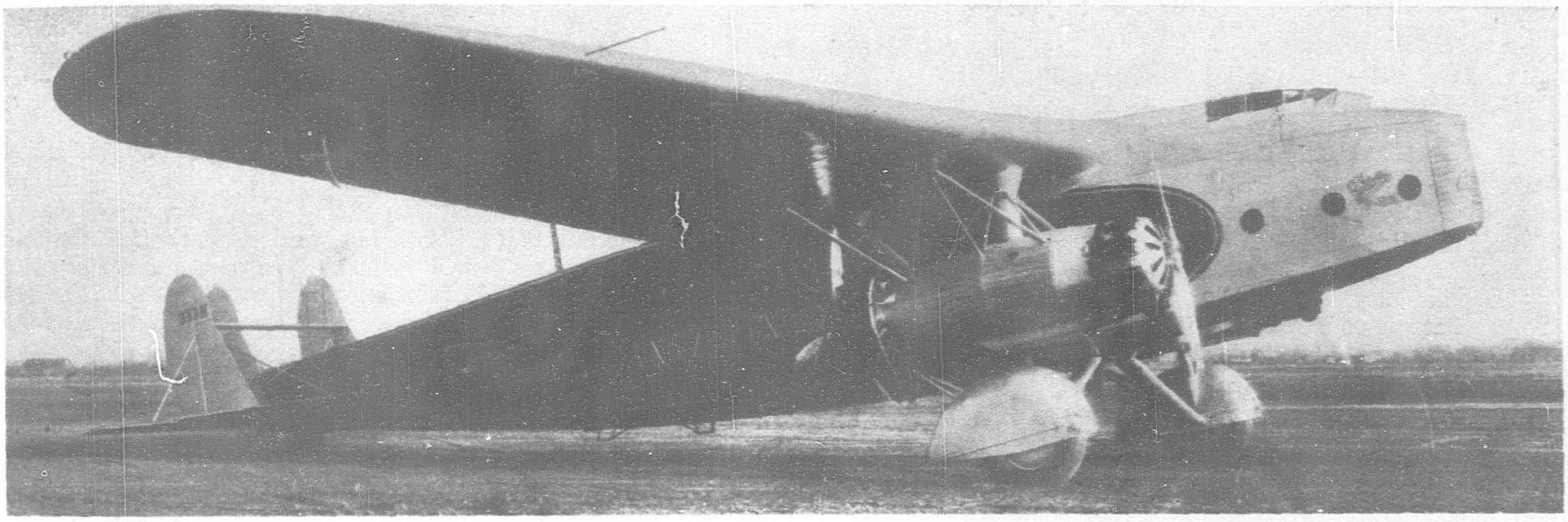
Dutch planes, with Dutch pilots, almost weekly cross jungle land never touched by the feet of white-men. These pilots, who connect the mother country with its island possessions, stop at Bangkok to pick up Siamese mail destined for European cities.



Stinson Junior with Floats. (The Type of Plane to be Used on the Hankow-Chungking route by the China National Aviation Corps is the same as this photo—the Stinson Senior 6-passenger plane, equipped with floats as shown in illustration)

Malaya Waking Up

The Straits Settlements have no regular air service at present, but the Far Eastern Airways Limited has proposed to the colonial government the establishment of a passenger and mail service daily between Singapore, Malacca, Port Swettenham and Penang, a distance of 415 miles. It is intended ultimately to extend the service from Penang to Prai, Khota Bharu and thence to Singgora, Bandon, Bangkok and Saigon. The air service will start from Singapore at 8 a.m., and arrive at Penang at 2.30 p.m. Leaving Prai at 3.30 p.m., aeroplanes will arrive at Khota Bharu on the eastern coast of the peninsula at 5.30 p.m. Mails by steamer between Singapore and Penang now take from 30 to 40 hours, and it is expected that when traders realize the great saving of time, a large amount of traffic will be attracted by this new service.

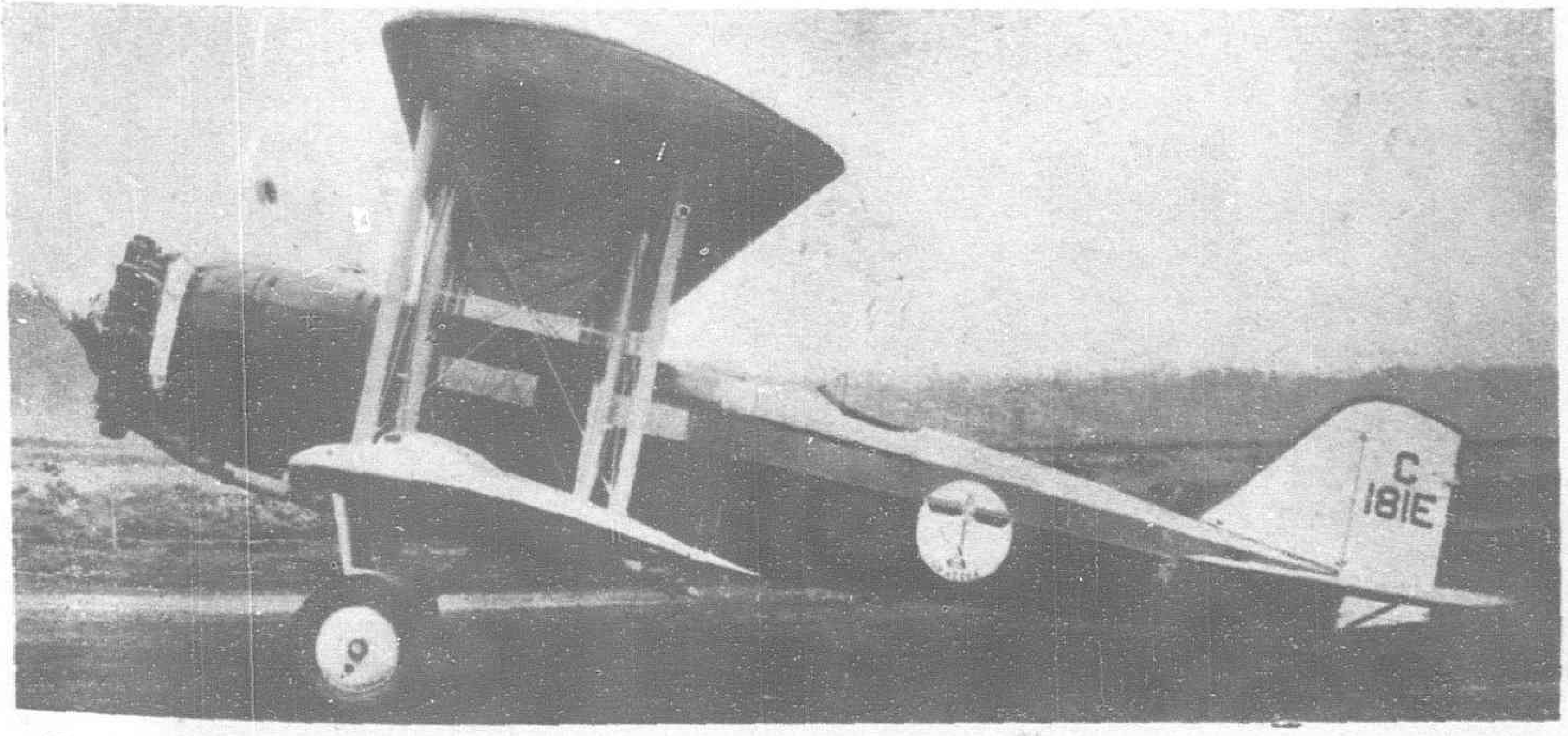


A Fokker F.32; 32 Passenger Cabin Monoplane Equipped with four Pratt & Whitney Hornet 575 h.p. Engines: Fokker Passenger Cabin Monoplanes are Flying the Dutch Air Mail route between Amsterdam and Java and the Japanese Air Route between Tokyo, Seoul and Dairen

On November 18, a company known as Malayan Air Services, Ltd, was formed in Kuala Lumpur. This company, whose managing agents are William Jacks and Co., (Malaya) Ltd., has bought a seaplane which is based at Port Swettenham. This will be used on aerial survey and photographic work.

The first Flying Club to be formed in the East was the Singapore Flying Club. This Club has used Gipsy-Moth seaplanes with great success and their machines are doing excellent work with great reliability. The Singapore Club can turn out a student formation on suitable occasions, and Mr. S. H. Potter, pilot instructor, reports 12 " A " licences and several members ready for solo.

The Federal Council at Kuala Lumpur, has contributed $75,000 to the funds and propaganda of the Rubber Growers' Association and $120,000 for the aerodrome at Taiping, one of the chain throughout the Peninsula that the Air Ministry is urging speedy completion. The Imperial Airways Limited of London is to connect Singapore with Calcutta and the route was opened in December by Air Marshal Geoffrey Salmond (India) with three R.A.F. Service supermarine-Napier flying boats. Ultimately, the Straits Settlements will be a link in the proposed air service between Great Britain and Australia. Negotiations have been under way with the Netherlands East Indies Company to connect the Straits Settlements by air with the Dutch East Indies, but it is considered improbable that the Straits Government will create undue competition between a Dutch company and the purely British enterprise which is negotiating to link up the principal places in Malaya.

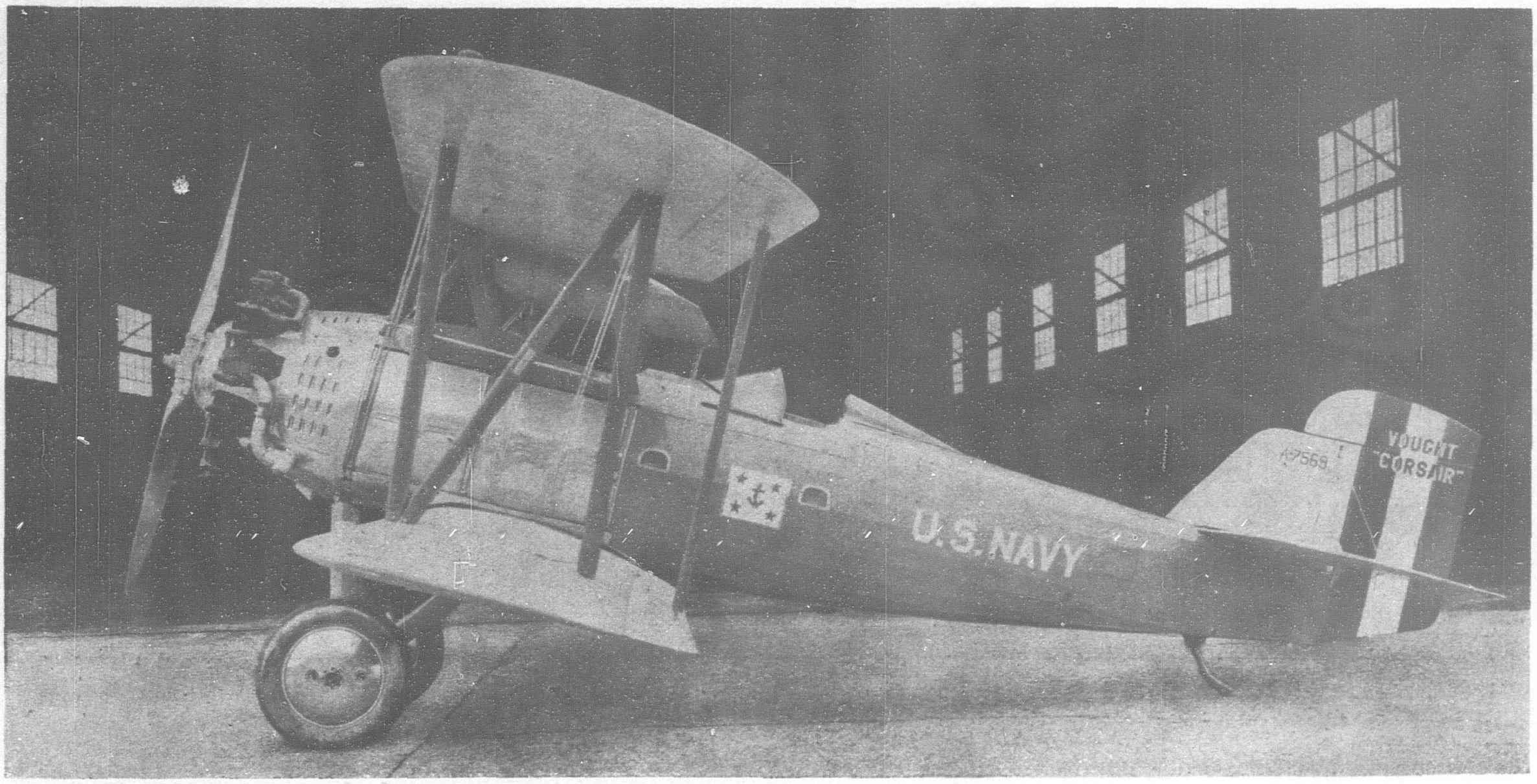


Boeing Type 40B Mail and Passenger Plane used on the U.S. Transcontinental Mail Lines

Sarawak abounds in disused and flooded mines and on one of the first flights ever made in that country an aeroplane landed in one of these. Owing to this unpremeditated landing it was found that the Gipsy-Moth seaplane (Cirrus engine) was suitable for the strenuous work which flying in Sarawak demands.

The Enterprising Dutch

During 1929 the Dutch East Indies appropriated approximately $500,000 for air transportation promotion. Early in October 1930, the Royal Netherlands East Indies Air Lines started a regular weekly air service between Batavia and Medan. The journey takes 10 hours each way and theplanes connect with the mail steamers



Thirty-two Vought "Corsairs" have been Sold to the Chinese Government, and are in Daily Service, Flying Hundreds of Hours Without Repairs or Adjustments

of the Netherlands Steamship Navigation Company and the Rotterdam Lloyd.

The lines now in operation are :—

Batavia-to Bandoeng, twice a day, 110 km. (69 miles), 45 minutes.

Batavia—Semarang—Sourabaya, daily 670 km. (420 miles), 4¾ hours.

Batavia—Palembang, weekly, 585 km, (365 miles), 3½ hours.

Batavia—Palembang—Singapore, 1,135 km. (710 miles), 7 hours.

Batavia—Palembang—Medan, weekly 1,600 km. (1,000 miles), 10 hours.

Operations were started in 1928 with four Fokker F. VIIb. 3m. aeroplanes (three Armstrong Siddeley Lynx engines). The fleet was gradually increased to seven machines of the same type. At the beginning of 1931, two 14-passenger Fokkers (three Pratt and Whitney Wasps) will be added. From November, 1928, to July, 1930, the K.N.I.L.M. has flown well over a million kilometers with 100 per cent regularity. Nearly 40,000 passengers have been carried.

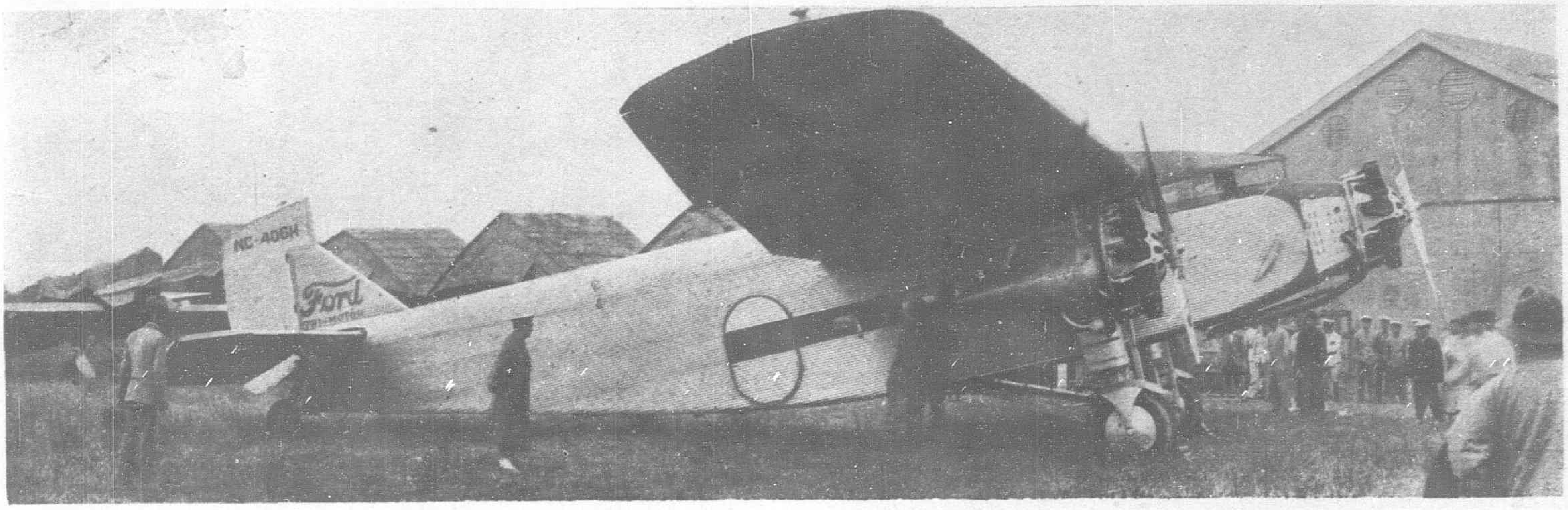
In February of last year, the Royal Netherlands East Indies Air Lines Co. inaugurated the Java-Sumatra-Malaya air service when a Fokker F.VII-3m. monoplane (three Armstrong Siddeley Lynx engines) flew from Batavia to Singapore in 7 hours, which time included a twenty-five minute stop at Palembang. The normal time by the fastest steamer is 38 hours. The service is operated once weekly and the single fare from Batavia to Singapore is $135. Emergency landing grounds were laid down at Telok Betong, Palembang, Marta Poera, Muntok and Singkep.

The establishment of a regular dirigible service between Europe and the Dutch East Indies was forecast by Dr. Hugo Eckener in

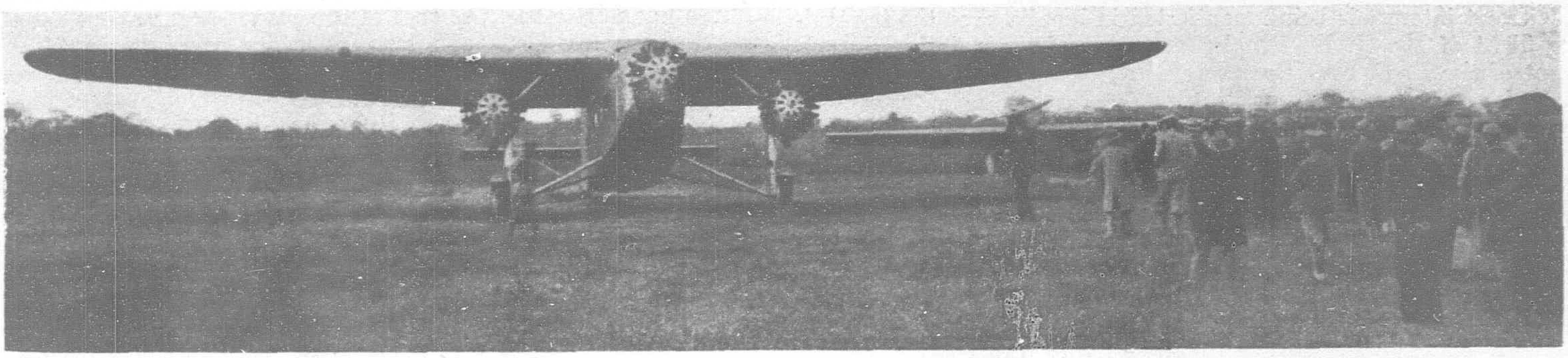
The "Cheng Kung" (Success) No. 1. A Chinese Plane Made at the Chinese Government Hungjao Aircraft Factory, near Shanghai

THE GIANT FORD COMES TO CHINA

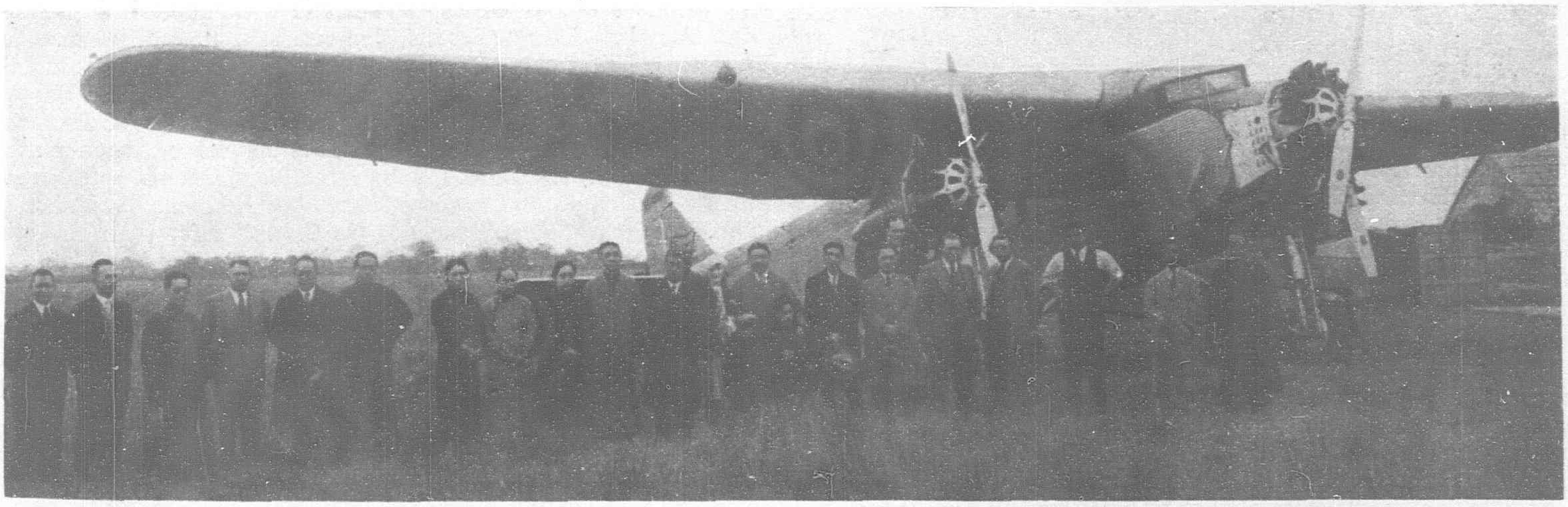
Hundreds of the leading officials and business men of China rode on the Giant Ford Plane at Mukden, Tientsin, Shanghai and Nanking. These Demonstration Flights have doubtless done more to give the leading citizens of China confidence in safe air travel than any other factor



The Giant Ford 'Plane at Shanghai



Ready for Demonstration Flight over Shanghai



Dr. C. T. Wang and Party of Business Men, Officials and Bankers who Flew to Nanking from Shanghai to Attend the Economic Conference

an interview given on January 10, just before leaving Germany for the United States from where he probably will continue his trip to Java and Sumatra to investigate the feasibility of such a service, especially with regard to the meteorological conditions prevailing there and *en route*. Dr. Eckener also stated that certain Dutch capitalists are evincing great interest in the project of an Amsterdam-Java air route and it is understood that these are prepared to subscribe Marks 40,000,000 towards the realization of such a project.

The Philippines Lagging Behind

Although the Philippines have lagged behind the rest of the Orient in the development of commercial aviation, the archipelago presents many possibilities for the successful use of aircraft in inter-island communication. The nearby territories of Australia, New Guinea, Siam, Java, Malaya, China and Japan are rapidly expanding their air services and in a few years these separate units will be linked up, first in a Far Eastern and then in a world-wide system, in which the Philippines by reason of their central geographical position, will become a most important factor.

The plans for large airship operation across the Pacific *via* Honolulu, contemplate making Manila the Asiatic terminus of this all-American enterprise. This will necessitate equally rapid and safe air feeders from all parts of the Eastern world. It has been difficult to interest local capital in the establishment of Insular air lines, but recently there was organized in Manila, the

Demonstration Giant Ford Flight at Nanking: In the Picture are Dr. and Mrs. C. T. Wang, Minister of Foreign Affairs; Dr. Chiang Mon-liang, Minister of Education; Dr. Tsai Yun-pei, Chairman of Control Yuan; Mr. Wang Chia-tseng, Vice Minister of Foreign Affairs

Philippine Aerial Taxi Company with a capital of Pesos 250,000 and an order cabled for two American Wacos and one German amphibian planes. Appropriate landing fields have been prepared and the initial service is scheduled to start by the end of January, 1931.

Great interest is being manifested in Manila over the impending flight of Mr. G. W. Brophy, manager of the aviation department of the L. E. Gale Company who is making a demonstration flight from Canton to Manila in the Waco biplane recently ordered by the Philippine Aerial Taxi Company. The flight is starting from Nanking, stopping at Foochow *en route* to Canton. Although the plane is a light training machine it is powered by a 110 h.p. Warner motor and Pilot Brophy is confident that he can make the flight without difficulty. This flight from Canton to Manila across the China Sea in the middle of the Northeast monsoon season when the passage is unusually rough for smaller craft, will, if successful, lead to negotiations between the Philippine and Chinese Governments for the inauguration of a mail and passenger service between the two countries, another distinct advance in Far Eastern aviation.

India Blocks Progress

In India, the British Government is most active in the development of aviation—but at present most of the flying is military. However, increasing interest in commercial and sports flying has led to numerous subsidies from the Government. A substantial sum was appropriated last year to aid private flying clubs at Calcutta, Madras and Karachi. More than Gold $100,000 was spent for the improvement of a commercial air-port at Dum Dum, near Calcutta. Dum Dum is expected to be an important center of Indian and International air traffic. The British Government has also expended Gold $350,000 for an airport site near Bombay, in addition to purchasing a sea-plane base at Rangoon.

The British Air Authorities are being subjected to considerable adverse criticism for their tardiness in perfecting an air mail service with China and depending upon the Dutch mail from Amsterdam to Bangkok. The Air Ministry, however, places the responsibility upon the Government of India whose plans are held up by lack of finances. The situation, outlined in a statement to the House of Commons in November, is that the Indian Government refuses permission to the Imperial Airways to operate the route beyond Karachi. A weekly air service between London and Karachi is being operated by the Imperial Airways under an agreement with the Air Ministry. The company is also operating under charter from the Indian Government an extension from Karachi to Delhi as an Indian State service. The Indian Government is also providing a series of aerodromes between Calcutta and Victoria Point, but the route is not yet open for operation. The Imperial Airways have submitted tentative proposals to the Air Ministry to provide for a weekly air mail service between England and Australia *via* Calcutta, Rangoon and Singapore, which are at present under consideration. Proposals for the operation of an Indian State Air service on the section between Karachi and Calcutta are understood to be under the consideration of the Government of India. The most recent information is that the Government of India is giving up temporarily the operation of the air service from Delhi to Rangoon. The Government program required the inauguration at the end of December of a service from Karachi to Calcutta *via* Delhi and Allahabad, to be carried on by Government aeroplanes. This plan has, however, been blocked by the financial crisis, the cost of the planes being about £40,000 and the landing fields and supplementary expenses to £45,000.

The British are also studying the possibilities of a line from Calcutta to Canton *via* Rangoon, in order to create a connection with South China. A British company has made formal application for permission to fly over French Indo-China in establishing an air service between Hongkong and Singapore. For the present, the key to this link in world air traffic is in Siam, on the stretch from Rangoon to a port in Siam over the most dreaded part of the route. While most of the flights from Rangoon to Bangkok have been in a straight line between the two points, commercial planes will have to take a different route selected not for speed but for safety. Most of the French and British planes flying to Saigon or to Australia have attempted the route which quarters upon range after range of high mountains and hills, topped often by clouds that obscure the passes and without landing places on the stretch. Commercial aviation can take no such chances and a route is being mapped out which will clear the western mountains of Siam in a 35 kilometer hop between the village of La Mao and Raheng. Landing fields are to be established every 35 kilometers along the telegraph right of way. It is understood that the newly formed Aerial Transport Company of Siam intends to make one of it's incidental objects the efficient establishment of an air route through Siam "*The Skyway to the Orient*" safer than any other similar route on the air path from Europe to the Far East.

The Wings of the Soviet

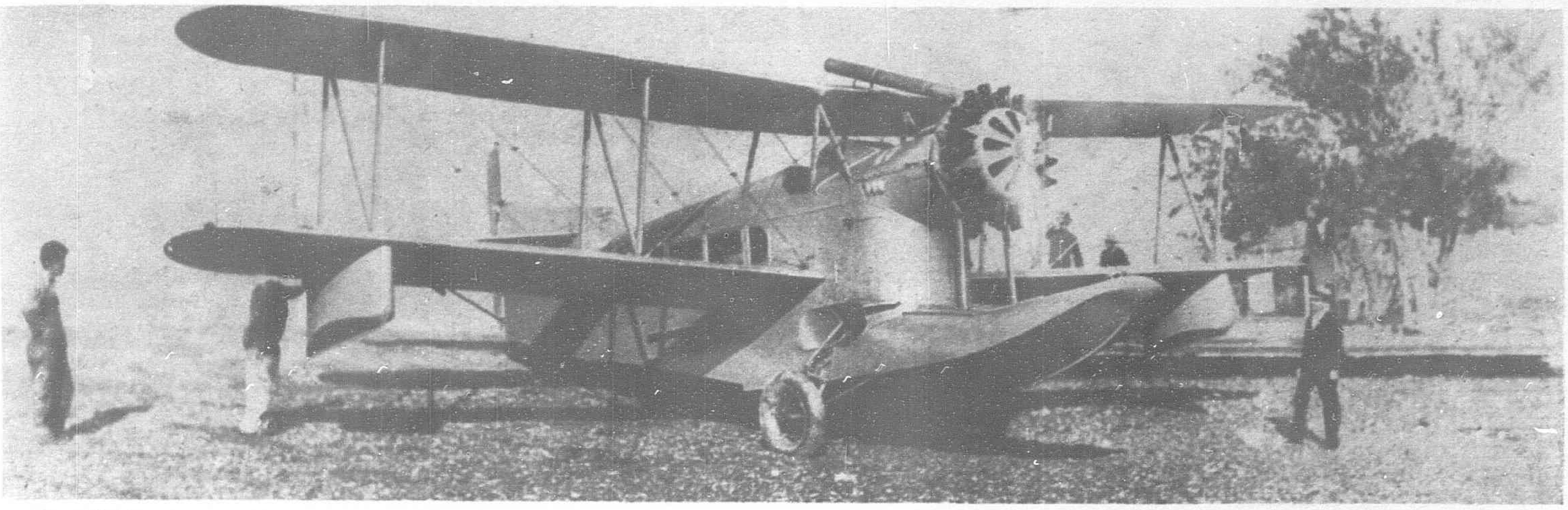
Notwithstanding its very recent development, airway communication in the Soviet Union has already achieved substantial results. Two companies are doing business on the territory of the Soviet Union. These are the Soviet-German company, Deruluft, the Soviet Dobrolst and the Ukanian company. Ukrvozdukhput. (The Ukranian Company has recently been merged with Dobrolet.) By 1927-1928 there were 12,000 kilometers of airway lines in operation. Over 10,000 passengers were carried during that year a total distance of 1,500,000 miles. In the same year airplanes surveyed and photographed 30,000 square kilometers and an approximately similar area was covered by them in the fight on injurious insects in fields and forests.

The Moscow-Berlin air-line enjoys wide and deserved popularity. Another air-line connecting Moscow, Kharkov, Rostov, Baku, Teheran (or Rostov, Sochi, Tiflis, Baku, Teheran) is also already quite popular and takes a prominent place in the system of communication between Moscow, Trans-Caucasia and Persia. The air-lines connecting Moscow with Central Asia and providing transportation facilities for Central Asia are gaining in popularity and importance.

The Five-Year Plan for economic development provides for increasing the length of air-lines from 12,000 kilometers in 1927-1928 to 45,000 kilometers in 1932-1933, the distance covered by the

THE POPULAR AIR SERVICE TO HANKOW

Operated by the Chinese National Aviation Corporation



The Six Passenger Keystone Amphibian Air Yacht Operating on a Daily Passenger and Mail Service between Shanghai and Hankow

airplanes from 1,500,000 to 28,000,000 kilometers and the number of passengers from 10,000 to 110,000. In other words, the Plan provides for a tenfold increase in the airway transportation of passengers, freight and mail. Keeping in mind the vast distances of the Soviet Union the significance of air mail can easily be appreciated. It is not surprising, therefore, that the Five-Year Plan contemplates increasing the weight of mail and parcels carried by airplanes from 230,000 kilograms at the beginning of the Five-Year Plan to four million kilograms at its end.

According to the Plan the total capital investment in commercial aviation is to reach 175 million rubles during this five-year period. Of this amount 100 million rubles will come from the state budget. The latest revision of the Plan submitted by the Chief inspector of the commercial air-fleet provides for increasing the total length of the air lines to 110,000 kilometers by 1932-33 and for corresponding increases in equipment. The total length reached 24,792 kilometers in 1929-30, an increase of 34 per cent over 1928-29.

An 8,000 kilometer trans-Asiatic Line is also planned; trial flights have already been made over the lines Irkutsk-Habarovsk and Habarovsk-Vladivostok. Beginning May 15, last, the air mail line between Moscow and Irkutsk resumed its schedule. Mail is delivered to and collected from the following points: Moscow, Kazan, Sverdlovsk, Kurgan, Omsk, Novosibirsk, Krasnoyarsk, Nishni-Udinsk, and Irkutsk. Mail leaving Moscow at 1 a.m. arrives in Irkutsk, about 36 hours later. The rates for air mail within the borders of the European or Asiatic parts of the U.S.S.R. are 10 kopeks (5 cents) for postcards and 20 kopeks for a letter. The rates for mail from the European part of the U.S.S.R. to the Asiatic part and *vice versa* are 20 and 40 kopeks respectively.

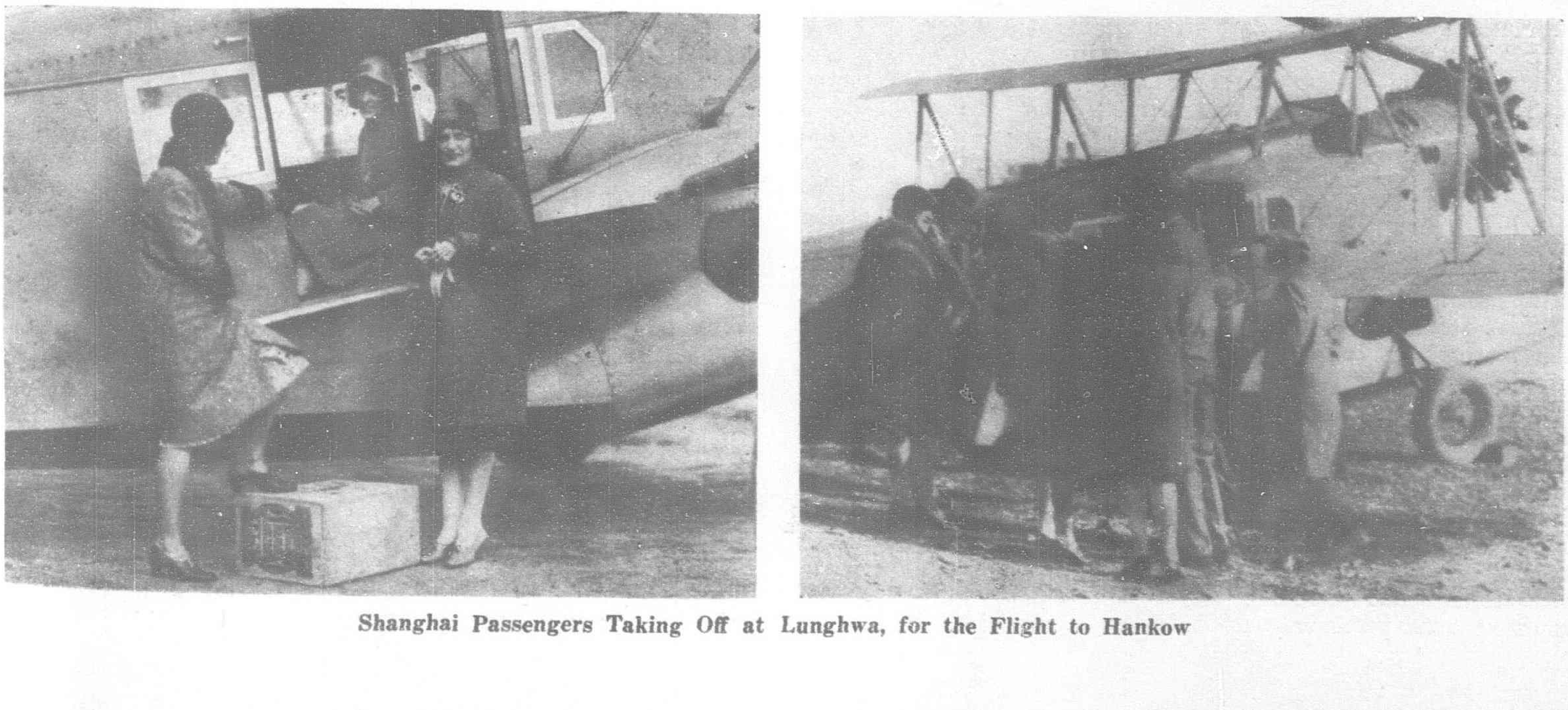
Early in August, the first passenger air line between points within Siberian borders was opened. The line, which operates between Novo-Sibirsk and Kuznetz, has its main airport at Kuznetz, with a number of intermediate stations. The air line will have two planes, and the flying schedule will be such as to meet planes flying between Moscow and Irkutsk. A new line, Irkutsk-Aldan opens on December 1. For this Polar line aerodromes were built in very hard conditions on the frozen "taiga."

The island of Saghalien will be connected with the mainland at Habarovsk by two lines, one from Oha and one from Alexandrovsk. The city of Nikolaievsk on the Amur becomes an aviation center from which lines go to Saghalien, Kamchatka and the Artic Ocean. In Central Asia the following new lines are to open: Tashkent-Alma Ata, connecting Central Asia with the capital Kazakstan, and thus avoiding a rail journey of more than two days, Tashkent-Osh, Tashkent-Chardjui.

A large Soviet plane of a new type, the "K.5," a 10 seater, designed by the Soviet aeronautical engineer, M. Kalinin, equipped with a 500 horse-power motor, will be introduced on many Soviet air lines. The Dobrolet has already placed orders for a number of planes of the new type.

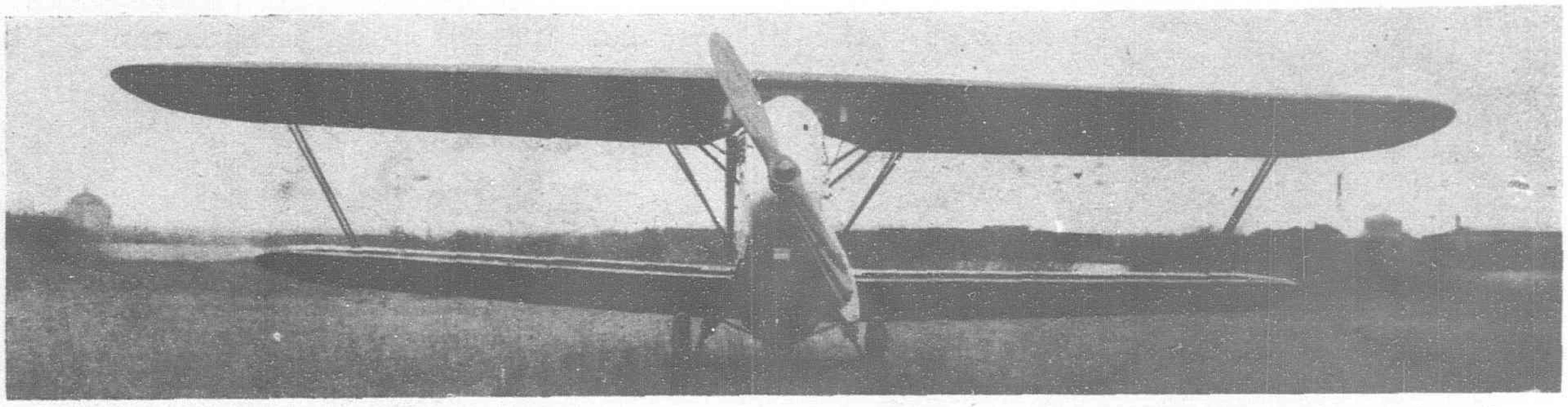
Persia Placing Orders

Before making a sudden jump from the Eastern European continent to that vast area of the world's surface known as China



Shanghai Passengers Taking Off at Lunghwa, for the Flight to Hankow

GERMAN PLANES FLYING IN CHINA

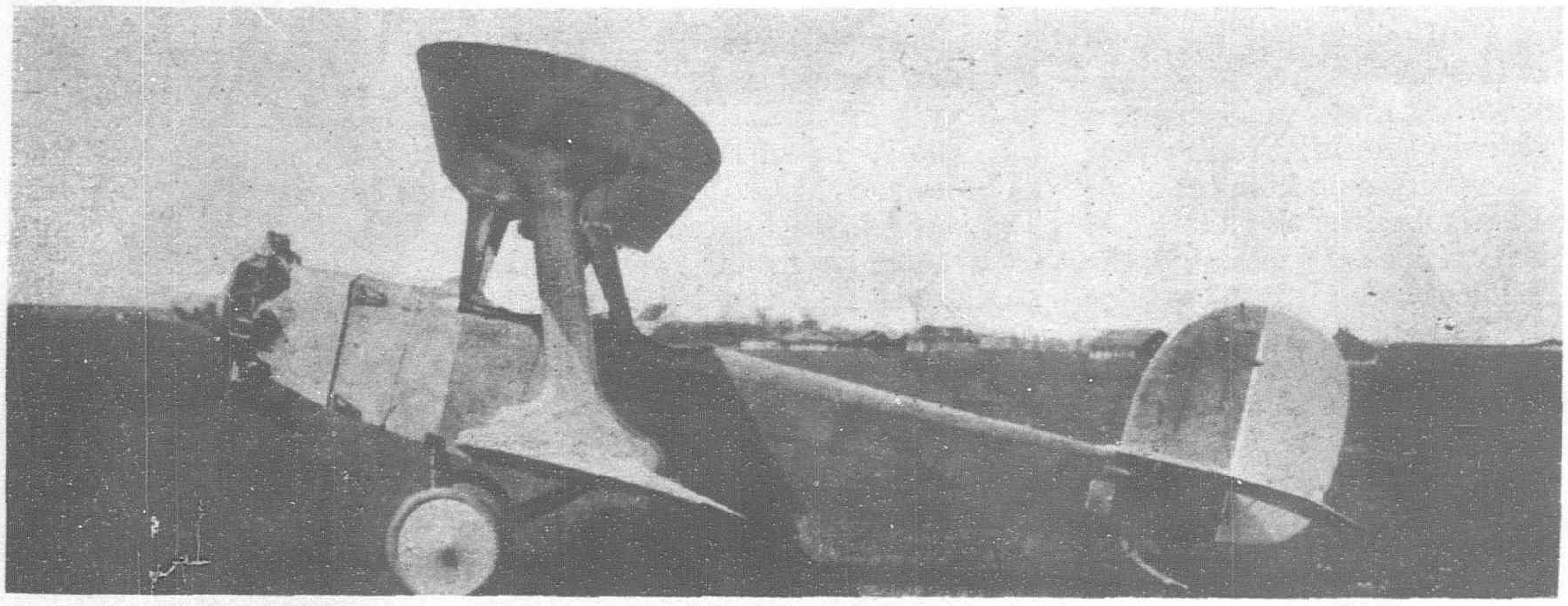


"Arado" S.C. II. Military or Commercial Plane Sentout to China by the German Aeronautical Association, for Demonstration Purposes, This Machine is being Flown by Major K. B. v. Doring, Attached to Carlowitz & Company.

an allusion to the development of flying in Persia would not be devoid of interest. It was announced in the *London Times* in a recent issue that the Persian Government has extended an invitation to foreign countries to send aeroplanes to Persia for exhibition and approval. The Persian Air Force is to have new and better machines and the Government has announced its intention of placing orders for satisfactory types. British aircraft from Iraq will attend and manufacturers from France, and Italy will also send demonstration machines.

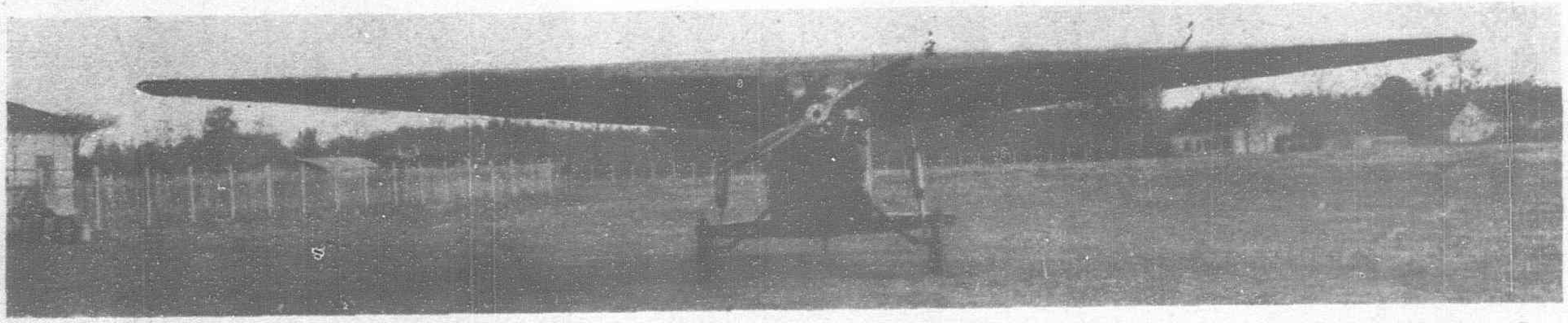
The Flying Marshal

Flying in that part of China known as the Three Eastern Provinces or Manchuria received its impetus when Marshal Chang Hsueh-liang learnt to fly. Not so very many years ago people would have looked in wide-eyed astonishment if it had been suggested to them that the ruler of any province in China would become a flying enthusiast. The suggestion implies such a reversal of old ideas that astonishment would have been pardonable. The provincial ruler of those days lived behind his screen of bodyguards, dealt summary justice or otherwise—inside his domain, and even when leading his armies in battle kept so well in the background that his safety was assured.



"Bayerische" Training Plane BFWU12, Flamingo; Used for Military Training by the National Government of China

Nevertheless, all these things have been accomplished by the Young Marshal. He has learnt to fly his own plane. He has accepted the modern and Western idea of the position of the ruler and has repudiated that thinly veiled contempt for foreigners which once characterized the ancient mandarins. Last July Captain W. E. F. Jones, D.F.C., manager of the Aviation Department of Messrs. Arnhold & Co., Ltd., handed over to the Marshal on behalf of his firm six of the latest Gipsy-Moth de Haviland military training 'planes and a de Haviland de-luxe 'plane for his private use. These 'planes have formed the nucleus of a modern air force and will replace the 200 partially obsolete planes which had constituted, up to then, that branch of the Manchurian fighting forces.



"Bayerische" B.F.W.M. 18d. Sold to the Chekiang Conservancy Board for Aerial Survey Work, Equipped With Zeiss Aerial Camera

Manchurian air pilots are being trained by Japanese aviators. The Japanese sent over a mission of twelve instructors, comprising six pilots and six mechanical experts who brought their own craft with them. However, Manchurian pupils will use the Gipsy-Moths during the period of tuition.

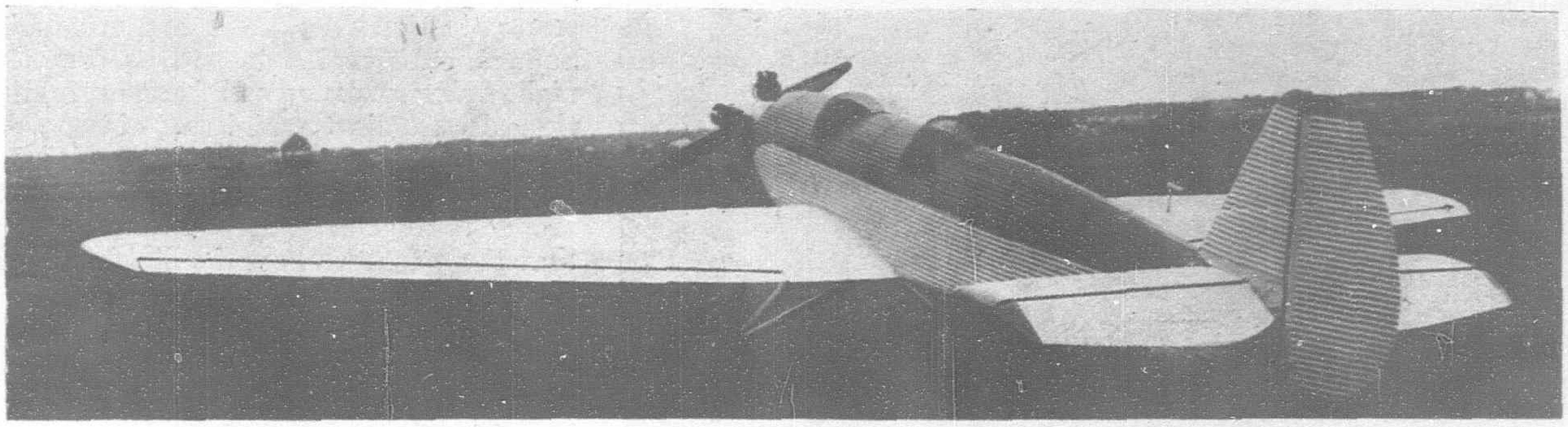
China's Air Mail Services

In North, Central and South China poor roads and the absence of an adequate railroad system no doubt speeded up the coming of aviation. China is in the unique position of developing her airlines first before perfecting her railways. No doubt her wars which come with almost monotonous frequency have been responsible for this acceleration of aviation within her national boundaries.

Many new routes are being opened up south of the Great Wall, but it would perhaps be of interest to refer to those which have been in existence for some little time. The most important of China's air-routes is that which follows the Yangtze river and which is served by the Keystone-Loening Amphibian planes of the China National Aviation Corporation, a joint Chinese-American Company of which the Curtiss group of the United States were the founders. These amphibians leave regularly from Shanghai and do the journey to Hankow in a little over six hours, calling at Nanking and Kiukiang *en route*. Wuhu and Anking have recently been added as ports of call on this route.

Arrangements have been made for this line to be extended to Ichang and later on to Chungking. Up to the present, political conditions between Hankow and Chungking have made the extension of the Yangtze river route impossible. The province of Szechuen has given very little indication of its desire to co-operate with the Nanking Government, and only a short time ago one of the province's leading generals whose armies controlled

GERMAN PLANES IN CHINA



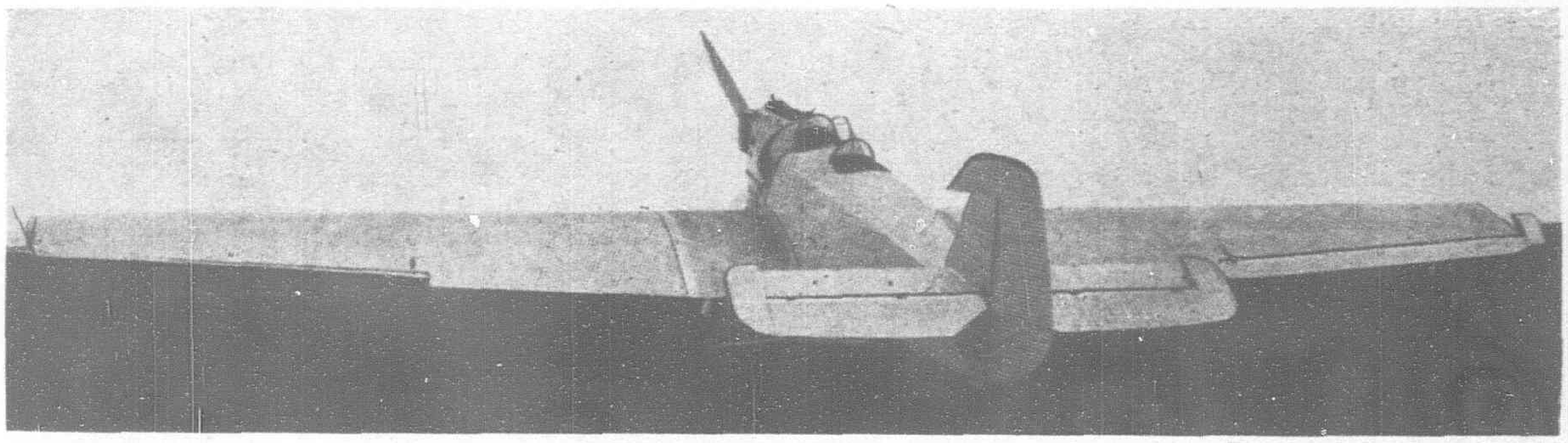
Junkers Light Sporting Model, Used for Training by the National Government

that area over which the amphibians were to fly—threatened to shoot any 'plane passing over his territory. However, things are now changing rapidly, so with tact and diplomacy there is no doubt that a Shanghai-Chungking air service will be fully realized before Spring.

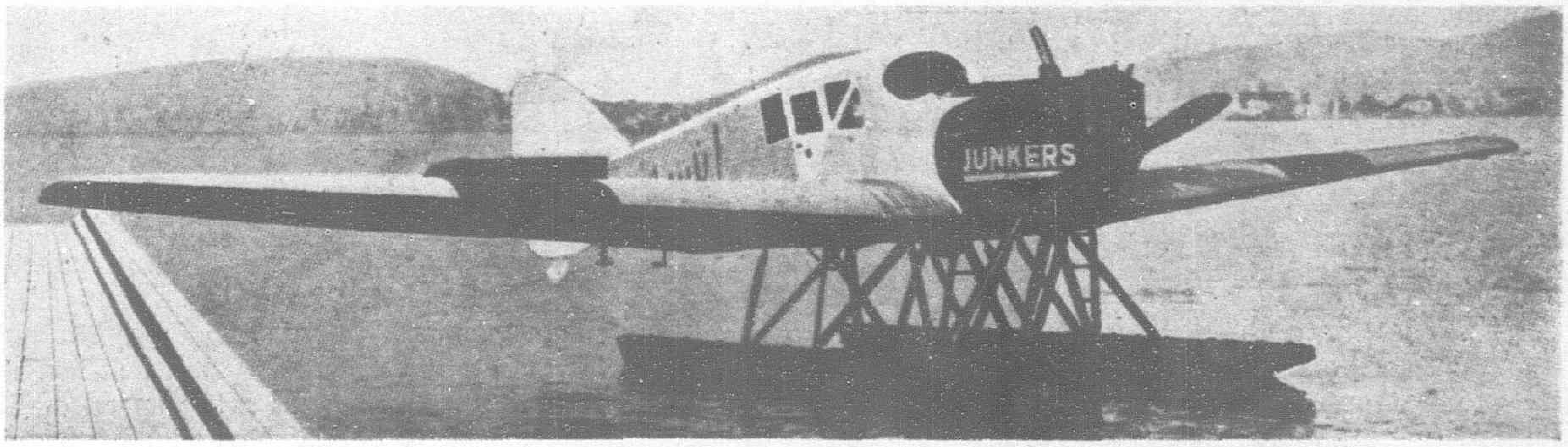
The China National Aviation Corporation possess the enviable record of flying some 300,000 miles without accident or mechanical forced landing. These amphibians are excellently suited to the route over which they fly as they are able to come down on land or upon the river. The pilots of this company served under the National Air Transport Company, whose headquarters are in Chicago, where they received a thorough training in aviation and all its branches.

Canton's Ambitious Program

The Canton Aviation Bureau recently inaugurated a service linking Canton with Wuchow and Canton with Swatow (223 miles). This will be followed by a service between Canton and Hoihow (Hainan) and, from there to Pakhoi, a distance of 300 miles. When these lines are in working order, intermediate calls will be made at Samshui and Shiuhing on the Wuchow Line, Waichow on the Swatow line and Kwangchowwan on the Hoihow line. Ryan machines are used and although the Wuchow route has only been recently opened, it is very popular with the Cantonese business man. The fares on the lines operated by the Canton Aviation Bureau are on a basis of twenty cents a mile and work out at $22.40, between Canton and Wuchow; $41.60 from Canton to Swatow and $60.00 from Canton to Hoihow. Air mail postage is 15 cents per twenty grammes over the usual rates. Parcels will also be carried, limited as to size and weight, at 60 cents a kilo to Wuchow, $1.15 per kilo to Swatow and $1.50 per kilo to Hoihow. The flying schedule between Canton and Wuchow is one and a half hours; Canton and Swatow, three hours; Canton and Hoihow, four hours. It is interesting to note that the Director of the Canton Aviation Bureau, Mr. Wong Kong Yui, is to fly to the Dutch East Indies and the Straits Settlements to arouse the interest of the overseas Chinese towards aviation in their mother country.



Junkers all Metal Bombing Plane Used by the National Government



Junkers all Metal Commercial Aeroplane in use by the National Government

In addition to its other services, it is reported that the Canton Government has apportioned $50,000 as a subsidy in connection with the inauguration of a new airway in connecting Canton with Chungshan, the seat of the future free-port in Kwangtung. An aerodrome and landing ground is being constructed at Chungshan, under Government supervision.

1931 Extensions in China

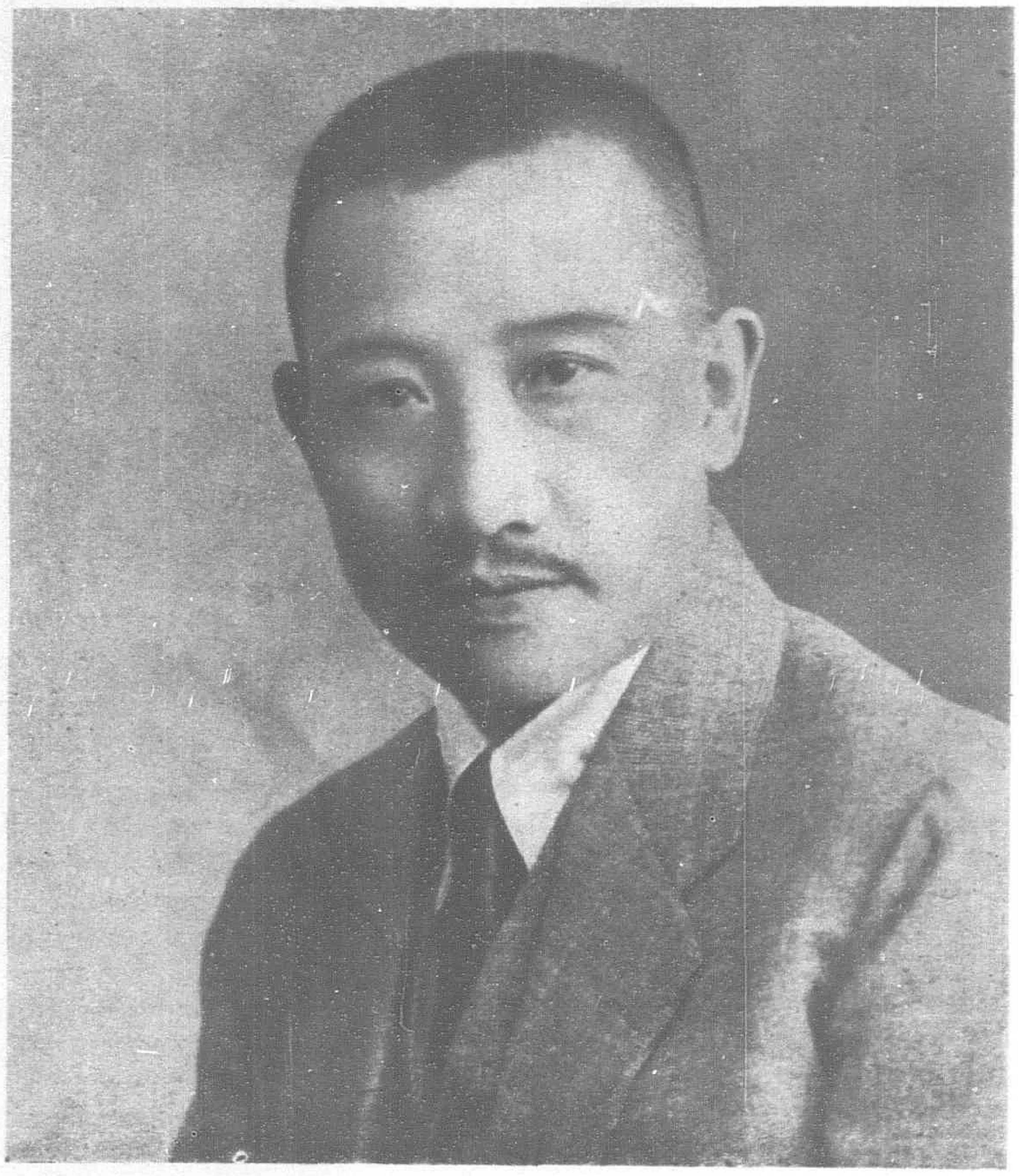
Other services which are shortly to be opened are the Nanking-Peiping, Shanghai-Tientsin, and Nanking-Mukden routes. This will bring these principal Chinese centers within a very short travelling time from the seat of the National Government. As a result of the recent understanding arrived at between the Young Marshal and Generalissimo Chiang, Mukden is to be connected with Nanking by a daily air-mail service. The route from Nanking will be *via* Pengpu, Hsuchow, Tsinan, Tientsin, Shanhaikwan and Chinchow and the service will be started with four French planes belonging to the Mukden Air Force. It is understood that the operating and maintenance costs will be shared equally between Nanking and Mukden.

The Nanking Government has also been approached by a foreign civil aviation company in China for permission to establish an airway connecting Nanking with Mukden. Nanking is understood to have expressed agreement with the scheme and a representative of the Company is negotiating with the Mukden authorities.

Now that peace reigns in North China, the Ministry of Communications is speeding up preparations to inaugurate the Nanking-Peiping air service some time in February. This route will follow the Tientsin-Pukow Railway. This is one of the services provided for in the contract between the Chinese Government and the China National Aviation Corporation, whose establishment has been postponed because of hostilities in the regions traversed.

Peiping as an Airport

Peiping is looking forward to becoming an important airport. The Young Marshal has transferred a large number of his fighting



Mr. Wang Pe-chun, China's Energetic Minister of Communications Under Whose Direction the Air Mail Services of the Country are being Rapidly Extended

planes to this center from which the immediate districts and the Northwest Provinces can be efficiently policed. A secondary military training school for the Mukden Air Force is to be established at Peiping. There are any number of ideal landing fields in the immediate vicinity of the old capital and with the inauguration of the Nanking-Peiping air mail, the Nanking-Berlin service, the military training schools and other local and police lines, it is expected that great developments will take place during the coming year.

Nanking-Moscow-Berlin

The route which is arousing great interest is the proposed trans-continental service between Nanking and Berlin which is to be inaugurated by the German Lufthansa Company. The German company has been spurred on by the Pacific Zeppelin Company of the United States who are to operate an air service between California and Hawaii, and then to the Philippine Islands and China. In connection with the Lufthansa's proposed scheme to link Europe with China by a fleet of gigantic flying machines, the German Government has officially stated that it will not grant this company a subsidy on the grounds of cost. However, so confident is Lufthansa that its scheme will be successful it is forging ahead and an agreement has already been arrived at between this company and the Nanking Government.

The latest reports as to the progress of this scheme are to the effect that all arrangements between Nanking and the German Company have been concluded favorably and that four German aeroplanes each costing $50,000 have been shipped from Hamburg and are due in Shanghai before February 10, while the second consignment will follow immediately. Four German pilots, one aviation engineer, eight mechanics and an expert in trade conditions have been engaged. The first group of experts will arrive February 1, while the others are due about March 1.

The planes passed successful tests before the German national aviation board while all the experts hold certificates.

Three lines are planned for the service, one across Sinkiang to Germany, another across Mongolia *via* Urga to Germany *via* Siberia and the last one from Manchuria to Germany *via* Siberia. The Russian government has not approved these plans and further negotiations are being carried on with Moscow by Lufthansa authorities. Should the negotiations fail, the Soviet authorities will be requested to establish services linking those of the German government and the Sino-German Aviation Corporation for direct transportation from Asia to Europe *via* Manchuli, The Berlin-Shanghai Air mail trip will be completed in six days and when night flying is made possible and safe, the time will be shortened to three days against a minimum of two weeks by any southern Asiatic route *via* India, Burma, Siam and Indo-China. Conditions in South China are so unstable, and the difficulties of negotiating a proper arrangement with the Chinese authorities so discouraging, that there is little hope for linking up China with Europe *via* the Southern route for some time to come. The only competition that can be reasonably expected from other European interests would be a hop from Rangoon to Canton, over extremely hazardous and uncharted high mountain ranges.

It is confidently expected that this new Sino-German enterprise will materially assist in opening a market in China for German-made aircraft. The leading German air-craft manufacturers, such as the Albatross, Arado, Bayerische, Donier, Fock-Wulff, Heinkle, and the Leichtflugzeugbau, with the Argus, Rayerische and Siemens-Halske motors, represented by Carlowitz & Company, are actively in the field for Chinese business. An "Arado" military bombing and fighting plane arrived in Shanghai recently, piloted by Major von Doring to make a demonstration tour of the principal centers of China.

Hongkong's Isolation

The intense nationalism of the Chinese and their desire to penalize and injure British interests, has been a barrier to British initiative in establishing air routes radiating from Hongkong. Hongkong, however, is going ahead with its own plans, the government taking a great interest in the developments. Last June, the Hongkong Flying Club, was organized, the government granting an initial sum of $60,000 and an annual subsidy of $30,000. A flying base and aerodrome has been established at Kai Tack. The main object of the Club is to assist the Government in case of emergency, all members taking an oath to place their services and planes at the disposal of the authorities in the event of necessity. The prime mover in the formation of the Club was Mr. R. Vaughan Fowler, Manager of the Far East Aviation Company Ltd. and Flg. Off. A. D. Bennett, R.A.F. gave voluntary help with pupils until such time as the official instructor arrived from England. The Club at present operates from Kai Tak Aerodrome and is storing its machines in the R.A.F. sheds there. The Home Government has sent out Flight Lieutenant A. J. R. Moss, as technical adviser to the Colonial Director of Air Services of Hongkong.

It is rather discouraging to learn that the first air letter ever sent from Hongkong to Canton was carried by Flying Officer A. V. Harvey on December 2, when he delivered to the Civil Governor of Kwangtung the greetings of the Governor of the British Crown Colony. Officer Harvey, a pilot of the Far East Aviation Company, flew an Avro-Avian V.R.—H.A.D. between Hongkong and Canton in one hour. It seems incredible that notwithstanding the advances of aviation in other parts of China, that no service has been established between these important centers, separated by a distance of ninety miles, which takes four hours by train, if and when the railway is open and safe for traffic.

Hongkong newpapers of January 10, state that they are asked by the Postal Commissioner at Canton to advise the public that, acting under instructions from the Directors General of Posts, an air mail service between Canton and Wuchow and *vice versa* has been authorized. The first air mail flight will be inaugurated on Friday, January 16, and arrangements have been made for Wuchow-Hongkong mails to reach Canton in time to catch the afternoon boats leaving for Hongkong.

The Canton Air Force, has already several wooden Avian planes in use for training purposes. The new Avian flown by Officer Harvey on his record flight, is an all-metal plane, the latest production of the Avro Works, fitted with the latest Cirrus Hermes engine, with fuel tanks for long distance flights enabling it to fly continuously without refilling for seven and a half hours at an average speed of 100 m.p.h. and a top speed of 120 m.p.h. Officer Harvey subsequently made a solo flight from Hongkong to Shanghai in a little more than nine and a half hours, stopping at Amoy and

Foochow for demonstrating the plane to the Chinese. He proceeded from Shanghai to Nanking.

Keen Competition in China

Types of American machines used in China for commercial purposes are the Loening, the Ryan and the Stinson-Detroiter. The American Vought Corsair, Douglas, the Fairchild, the Waco, the British Gipsy-Moth and several German types are in use by the military. A Westland Wapiti is now making a demonstration tour of China. The Wapiti is the same machine used by the Royal Air Force on the North-West Frontier of India to curb the activities of the warring Afridis.

A keen rivalry exists in China between the aircraft manufacturers of the world, but as the market has been almost entirely confined to planes for military use, it is difficult to ascertain the total number in operation in the country. Both Nanking and Mukden have made their own secret purchases and practically every independent war-lord and provincial government have been purchasing planes on their own account. A recent newspaper article gave the number of planes in Manchuria as 300, but Mr. Bess the United Press correspondent says the actual number of effective planes is only one-tenth of this number. Marshal Chang Tso-lin early recognized the superior advantage of having an efficient air force and bought planes rather indiscriminately from abroad, with the result that most of them are now hopelessly out of date, and serviceable only for training purposes. Since his death, his son and successor, Marshal Chang Hsueh-liang, has had it impressed upon him that unless he possesses a really up-to-date and efficient military air force, he is open to attack from all sides. In the recent " war " with Russia, the Manchurian air-force was hopelessly outclassed. Russian aviators routed Chinese regiments merely by dropping bags of soot and refuse. In fact, their use of planes made their other military preparations unnecessary. The strenuous efforts of General Chiang Kai-shek to build up an efficient air force for the Nanking Government also made a deep impression on the Manchurian leader, who early last year started to augment his air squadrons by the addition of more modern equipment.

Britain's Splendid Effort

The Mukden authorities got their first planes and instruction from France but recently Japanese instructors have taken over supervision, of the Manchurian aviation services, with six pilots and six mechanics as instructors. A very enterprising British aviation expert visited Mukden last year, and not only sold the Young Marshal some new planes but taught him how to fly. Captain W. E. F. Jones, D.F.C., manager of the Aviation Department of Arnhold & Company recently handed over to the Young Marshal six of the latest Gipsy-Moth de Haviland military training planes and a de Haviland de-luxe plane for his private use. These planes will form the nucleus of a modern air force to replace the 200 to 300 partially obsolete planes. Captain Jones has also sold Gipsy-Moths to the Chinese authorities in Hankow, Nanking, Taiyuanfu, Changsha, Kaifeng, Shanghai and Chungking.

The sales methods adopted by Captain Jones, is to bring the aircraft to China and demonstrate them to the satisfaction of the Chinese buyer, prior to purchase. In this way he has brought before the Chinese many of the foremost British aircraft such as the " Lincock," " Fairy III-F," " De Haviland Puss," and " Blackburn Lincock," " De Haviland Hawk-Moth," and " De Haviland Hercules." After sales have been effected, British experts supervise the assembling and rigging of the planes, and giving demonstration and test flights in the presence of the Buyers in order to assure full satisfaction. This method has obviated complaints and resulted in a large number of repeat orders. Other British planes are being demonstrated in China along the same lines, amongst them a Westland Wapiti and a Vickers " Vespa " Army Co-operation Aircraft, whose agents are the Jardine Engineering Corporation, Ltd. The British are now making a splendid effort to make up for lost time in this market, but the agents of American aircraft manufacturers are as keenly alive to the possibilities and so far have the edge on all competitors with commercial aircraft.

American Planes Lead in China

The actual number of American planes and motors sold in China during 1930 can be accurately ascertained only by an analysis of the American customs reports as many of the sales have been for military purposes and their purchase and delivery shrouded in more or less official secrecy. At least fifty-five machines have been sold for military purposes to the Nanking Government alone. The Canton Aviation Bureau has acquired two Ryan six passenger planes and the Yunnan Government have also purchased two six passenger mail and six passenger planes, powered with a 300 h.p. motor for the purpose of starting their air mail service between Yunnanfu and Canton.

Of special interest was the demonstration of the big Ford tri-motored passenger plane which made several flights at Nanking, Shanghai, Tientsin and Mukden, carrying a large number of prominent officials and leading business men who had their first experience in safe commercial flying. Several other demonstration planes have been brought out by representatives of American manufacturers and it is expected that the year 1931 will witness an unusual activity in the extension of the Chinese Government and Provincial air mail and passenger services.

Some of the planes recently sold by the L. E. Gale Company include six military ships for the Hunan Government, two of which are Vought Corsairs and four Fairchilds, all equipped with two machine guns and bombing racks. The Vought Corsairs are 425 h.p. with a speed of 165 m.p.h. and the Fairchild's 165 h.p., 125 m.p.h. Eight Waco military planes were also sold by the same firm to the Canton Aviation Bureau equipped with two machine guns and a bombing rack. Two Ryan six passenger cabin monoplanes were also delivered to the same purchasers for the new Canton-Wuchow and Canton-Swatow services. This company is also furnishing the two Waco planes ordered by the Philippine Air Taxi Company to inaugurate its services. Pilot Brophy who is making a solo flight from Shanghai to Canton in a Waco, will continue his flight from Canton to Manila, a demonstration which is hoped will result in the establishment of a regular Canton-Manila service. Ten regulation U.S. Army planes, equipped with single motors, gun turrets and bombing racks, costing G.$250,000 were purchased by the National Government during the year from a Los Angeles firm.

German Activities

There are a large number of German aircraft in China. Nanking purchased 32 German Junkers early last year, including 24 light machines for military instruction, seven seaplanes and one freight carrier. Four German machines intended for the Chungking-Hankow service, ordered by the Szechuen Provincial Government have recently arrived in Shanghai and been forwarded to their destination. The Szechuanese are evidently determined to maintain their provincial independence as regards air transportation in the same way they opposed the Central Government's interference with their railway rights.

Chinese Aircraft Factory

There are indications that the Chinese do not intend to rely on foreign manufacturers for their purchases of new aircraft. As early as March of last year, it was reported that a group of Nanking officials had formed a joint company with certain American aviation interests for the establishment of an aeroplane factory in China, in which the capital was to be $300,000, two-thirds Chinese, with all administrative officials Chinese. American engineering experts were to direct and supervise the factory. Although nothing more was heard of this plan, the story is again current that such a company was recently organized by the Chinese Government and the American Curtiss-Wright interests.

In fact, the Chinese in their dreams of rapid industrialization, are confident that they can make just as good a plane as any that can be produced abroad and at half the cost. There are already three aeroplane factories in China, one at Hungjao, near Shanghai, one in Canton and one at Foochow. Up to the present these establishments have only built perhaps a dozen bodies, importing the engines. There are indications that these plants will be enlarged and production increased in order to save on the cost of the imported bodies.

Siam Bridge Contract to Japan

JAPANESE rolling stock and steel manufacturers are supplying all the requirements of their own railways and have a producing capacity far in excess of the domestic demands. They are looking forward to participating in the orders for railway equipment in other parts of Asia, and have already met with some success, especially in the supply of steel rails for the South Manchuria Railway, bridge girders and other material for the Japanese built lines in Manchuria. The Yawata Steel Works has also actively entered the China market for bars and plates.

The Japanese newspapers now announce that the Mitsui Bussan Kaisha has secured the contract for the erection of a steel bridge in Siam for the State Railway department. Commenting on this contract, *The Japan Times* says: "This is the first time for a Japanese firm to obtain such an award in Siam, and it is regarded in business circles here as heralding a new era for Japan's economic advancement in that country.

The Siamese Government last year invited the steel contractors of nearly all important nations to participate in a public bid for the construction of a steel railway bridge, and Japan's success in getting the award has a long story behind it. Japan has been trying to push her trade in that Far Eastern country during many years but has almost invariably failed to get any contract.

Therefore, when the Department of Railways received the invitation of the Siamese Government last year, it decided to make Japan's participation a national affair in point of importance.

The department undertook to call a secret conference of officials of the Mitsui Bussan, the Government Steel Works at Yawata, the Sumitomo Steel Foundry, the Osaka Shosen Kaisha, and the Japan Federation of Bridge Constructors. At this conference it was resolved that they should get the award, even at a loss, because they wanted to make it the beginning of Japan's export trade to Siam.

Then Dr. Tanaka of the Department of Railways was appointed head of the work of drawing up a plan.

When the public bids were opened, the award was given to the Japanese contractors at the price of Y.60,000, the total tonnage of steel material being 600. The bridge will be shipped to Siam within four months after the signing of the contract.

In view of the prevailing business depression, the news of getting the Siamese contract, has caused a big sensation among the exporters of the country, who hope to make similar economic advances in Soviet Russia, and Persia. These latter countries recently engaged Japanese railway experts and the officials of the Department of Railways expect that they will buy steel bridges from this country.

That Silver Loan

(Continued from page 13).

is to be used for development in the interior of China, where there is a silver famine, it will do no more than relieve the situation there, enabling producers to market more products, thus increasing export trade, 'and with such an increase the world silver market would be stabilized.' We would ask Mr. Hu how it has come about that there is a silver famine in the interior of China, in places where usually sycee is the common currency medium. Is it not because conditions became so unsafe that merchants shipped their sycee to the ports, and does it not remain there because trade routes are still infested with bandits. And is it not as certain as anything can be in this world that if communications were safe, merchants could reasonably expect that their cargoes would arrive intact and at not too great a cost in charges *en route*, and that they would not be looted after arrival, the huge silver stocks in Shanghai and other ports would speedily be so reduced that automatically more silver would be required from abroad? Messrs. Linebarger and Hu's thousand million ounces of the white metal would be no more secure in the interior to-day than would be the millions of taels of silver now waiting in Shanghai for the time when they can be used for trading in the interior. China does not require a silver loan from the United States or anywhere else, and should anyone fall into the error of supplying the quantity of metal sought by Mr. Linebarger, the revival of business here on a profitable basis will be indefinitely delayed."

The Key to Struggling China: A Drama of Three Zones

(Continued from page 18).

part of which China has no control whatever, or shall we limit ourselves to demanding stabilized conditions in approximately 2,000,000 square miles over which a national State in China is nominally in control; or shall we recognize the fact that, whereas Zone A and Manchuria are approaching conditions of stability and modernization, a vast region such as we have described as Zone B must remain for a long period in a state of turmoil and antique economic and social conditions?

THE FOREIGN INTERESTS

If we review the facts very closely it will be found that foreign interests are practically limited to Zone A and that Zone B is practically outside the scope of foreign trade and investments and, with rare exceptions, residence in China. The foreigner and the powers then must face the definite fact that they can treat with Zone A and Manchuria on one basis, while they need not concern themselves at all with conditions in Zone B if such do not actually disturb Zone A and Manchuria.

Any government of China, to protect itself and to develop a national State must continue military operations in Zone B; disarm the soldiers and bandits; suppress feudal forms and bring the people within the scope of the national State. This is the mere exercise of the police power of any State. This exercise of police power, which will be resisted because the rifle among these people is not merely a weapon of warfare but a tool for the earning of a living, may give to the world the appearance of chaos and instability. But unless this process of supression is followed through constantly and without regard to sentiment, China can never become a national State. It is this exercise of police power which characterized the civil war of the year 1930.

Osaka's New Buildings

The growth of the city of greater Osaka is surprising recently. By the constant skyward expansion of the city, numerous new buildings have risen to make the city's rugged sky-line more smooth. The total floor and building area of the buildings constructed during 1929 is as big as the whole area of the city of Shimonoseki, the Osaka Prefectural Building Section revealed Tuesday.

The total number of the newly constructed buildings in 1929 in Osaka, Sakai and Kishiwada amounted to 19,725, with the floor area of 633,134 tsubo.

Of these new structures, 8,589 (279,261 tsubo) were residential buildings, 3,114 (92,178 tsubo) were commercial buildings, and 1,137 (53,624 tsubo) were industrial buildings. This means an increase of 1,727 (more than 25,000 tsubo) as compared with the preceding year. A notable fact is that the building of annexes and repairing old buildings has decreased.

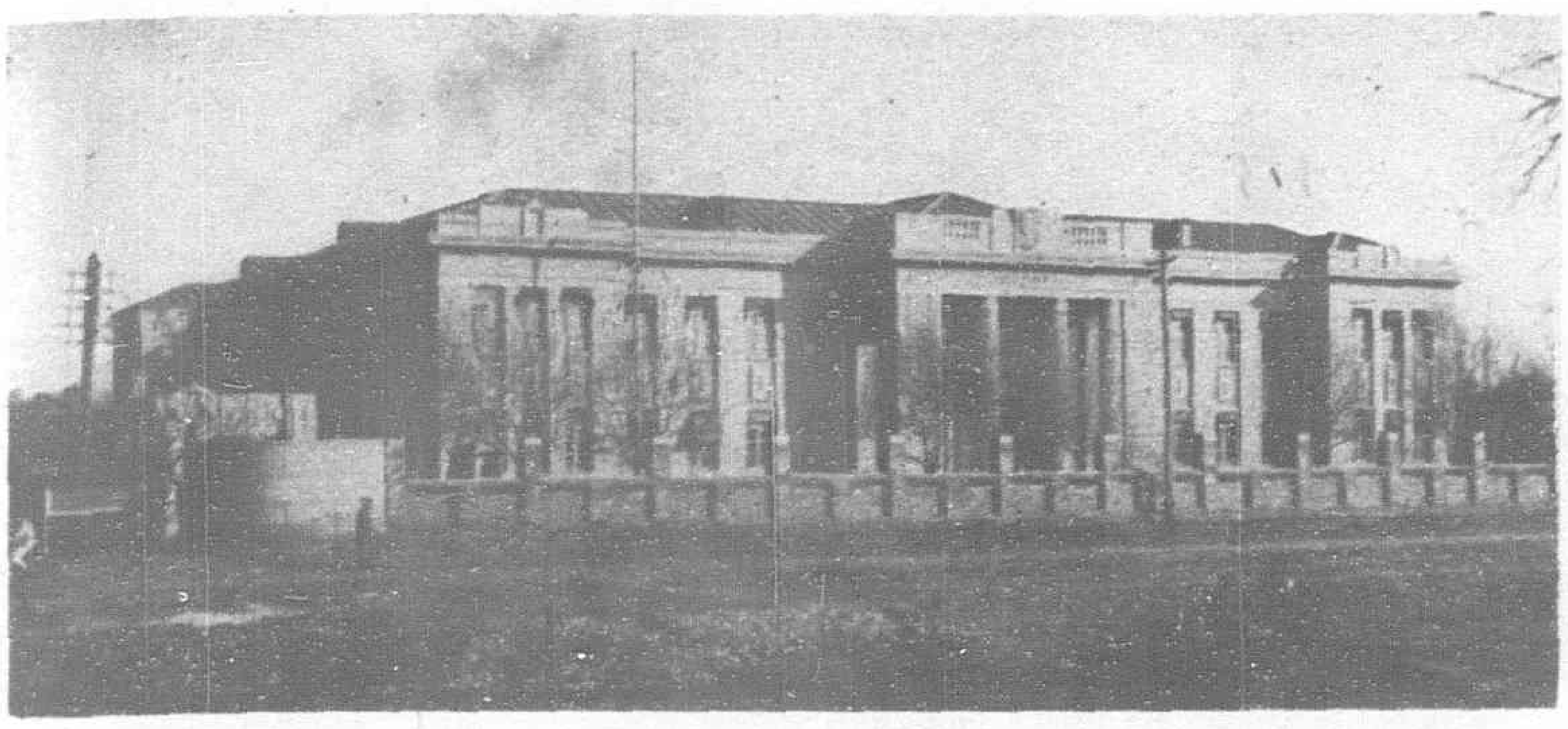
Of the fire-proof and quake-proof buildings added during 1929, eight were stone buildings, and 147 were ferro-concrete structures.

The majority of the new buildings were two-storied, followed by three-storied and four-storied. Following are the principal buildings constructed in 1929:

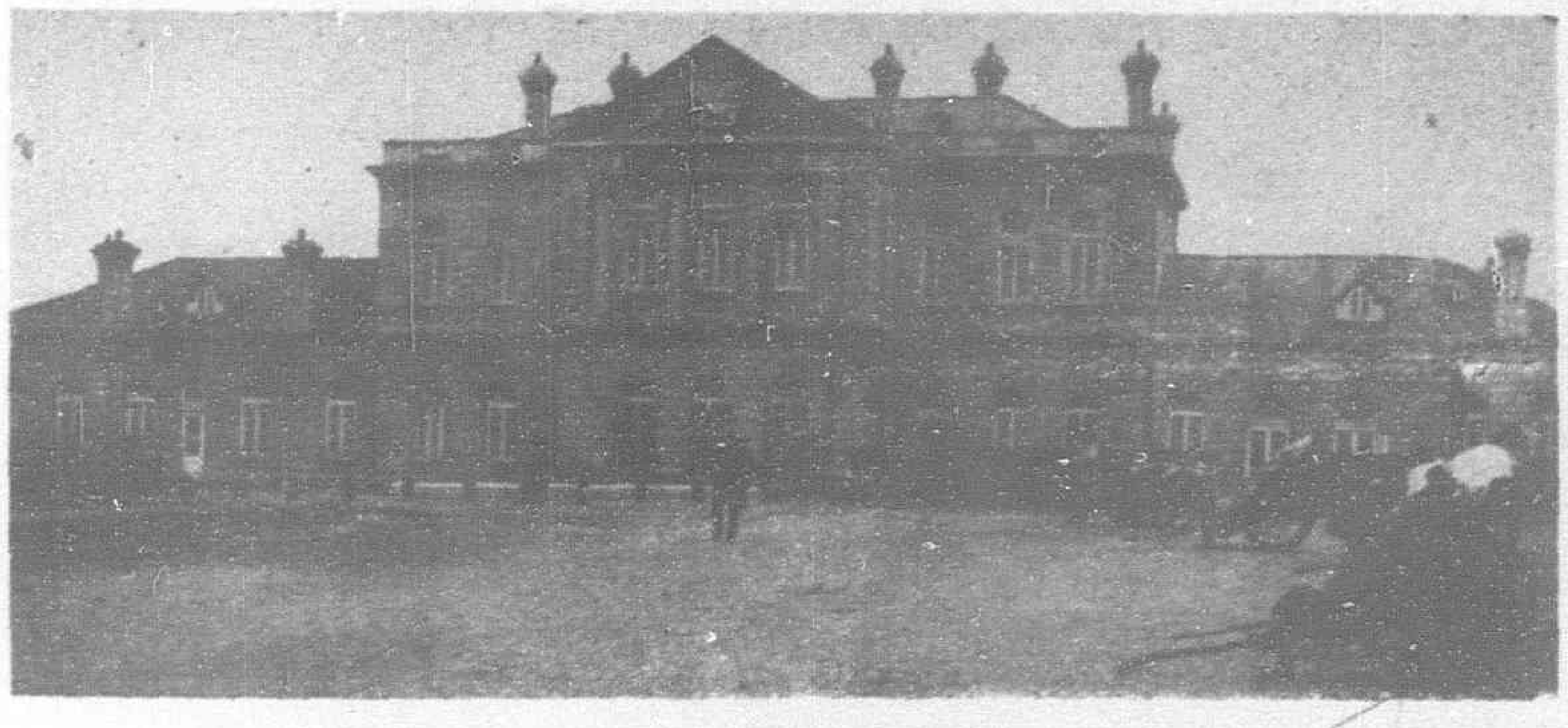
The Hankyu Building, Sonezaki Police Station and the Osaka Division of the Government Railways, (9-storied including the basement, each.)

The Sumitomo Warehouse, 7-storied. The Kokko Life Assurance Building, 5-storied. The Saihara Building, 6-storied. Tne Nippon Life Insurance Building, 6-storied.

Among the unusual buildings are the hangars at the Kizugawa International Airport, the ferro-concrete shrine at Tennoji, the Renaissance style brick building of the Bunrakuza puppet show theater and others. Some large ferro-concrete primary schools were also built, such as the Seika and Mitsu Primary Schools.



Administration Office of Kirin-Changchun and Kirin-Tunhua Railways



Kirin Station

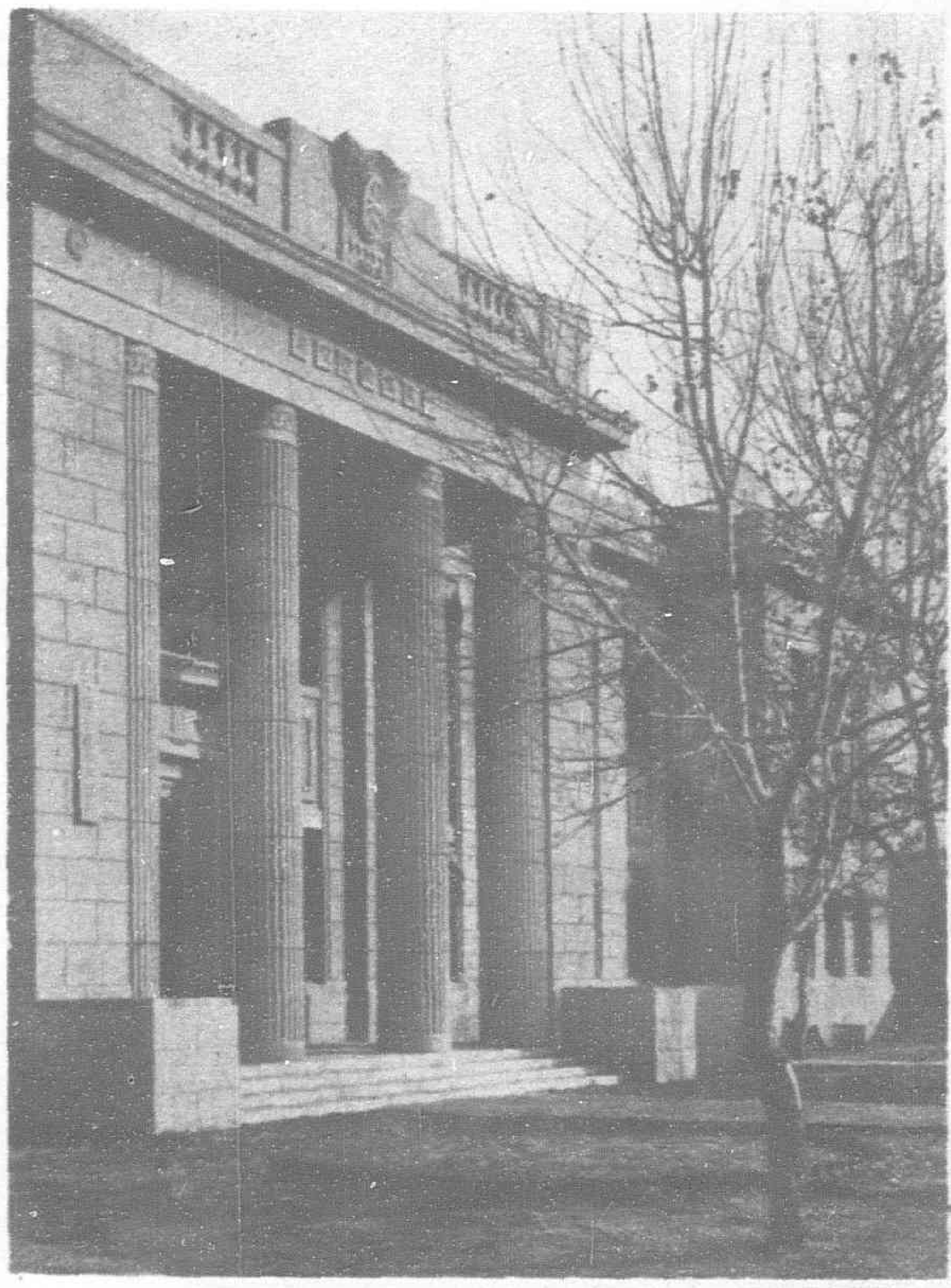
The Kirin-Tunhua Railway*

By L. I. LUBIMOFF

Of all the railway lines in Manchuria, particular attention is being centered on the new Kirin-Tunhua Railway, the construction of which was finished by the end of 1928, and which is an eastward extension of the Kirin-Changchun Railway.

The particular interest manifested at the present time in these Manchurian railways on the part of both Chinese and foreign circles is prompted not only by their importance for colonization, but also, in the first place, by the rôle which in future they will have to play in the general transportation problem in Manchuria, in respect to the direction taken by the exports and imports of the country.

Upon the construction of the Kirin-Tunhua Railway, which it is proposed in the course of the next years to extend further to the east—to connect with the Korean system of railways on the Korean border the ultimate design being to create a new trunk railways with an exit at the ports of North Korea—(Seishin, Rasshin or Yunghuei). In respect to distance, the new trunk line, which in this article will be called the Kirin-Korean railway line, will represent the shortest outlet to the sea for Manchurian goods. Owing to the last mentioned circumstance, there is no doubt but that the contemporary transportation situation in Manchuria will suffer a radical change upon the completion of the new line.



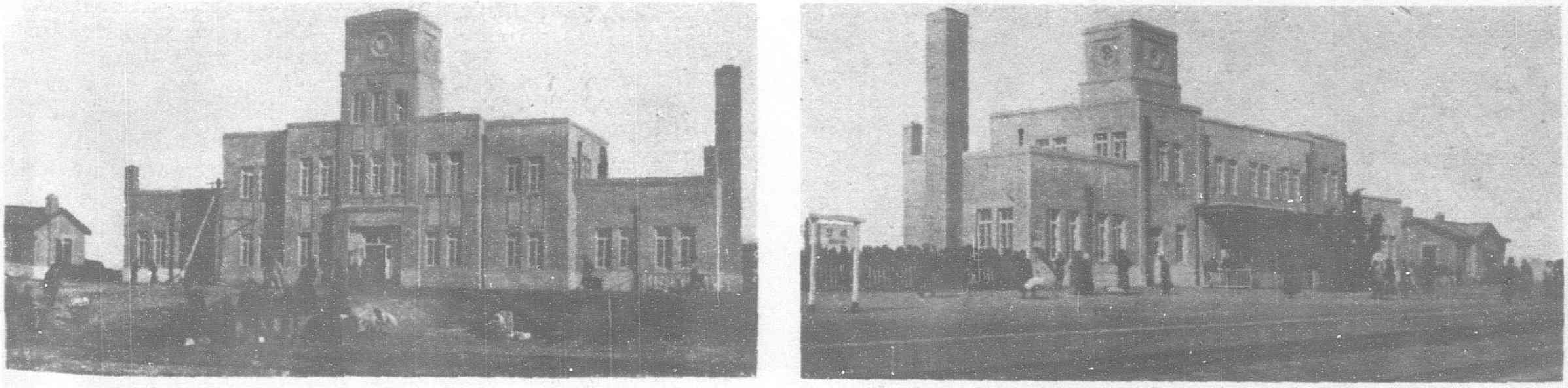
Entrance to Administration Building

The new line will be able to canvass an overwhelming quantity of Manchurian goods owing to its great advantages against other lines and routes, and this points to the great importance which it will acquire in the general transportation situation of the country.

The present article is devoted to this newly projected railway trunk line.

The construction of the Kirin-Tunhua Railway was carried on with very close co-operation on the part of Japan. As far back as 1909 an agreement was entered into between Japan and China regarding the frontier district of Chientao (districts of Tunhua, Yanchi, Holung, Wanching, etc.) over which there was dispute between the two countries. One of the articles of this agreement was to the effect that: "The Chinese Government will in future extend the Changchun-Kirin railway to the southern border of the Yanchi district, and connect it through Hoiren in Korea with the Korean railways. The method of construction of the 'Kirin-Hoiren' railway should be the same as that adopted for the Changchun-Kirin railway. The construction period will be determined by a supplementary agreement between China and Japan, depending upon circumstances."

However, after 1909, the question of an extension of the Kirin-Changchun Railway and that of the construction of the Kirin-Tunhua Railway fell into abeyance for a long time and were not



Front and Rear Views of Yaoho Station

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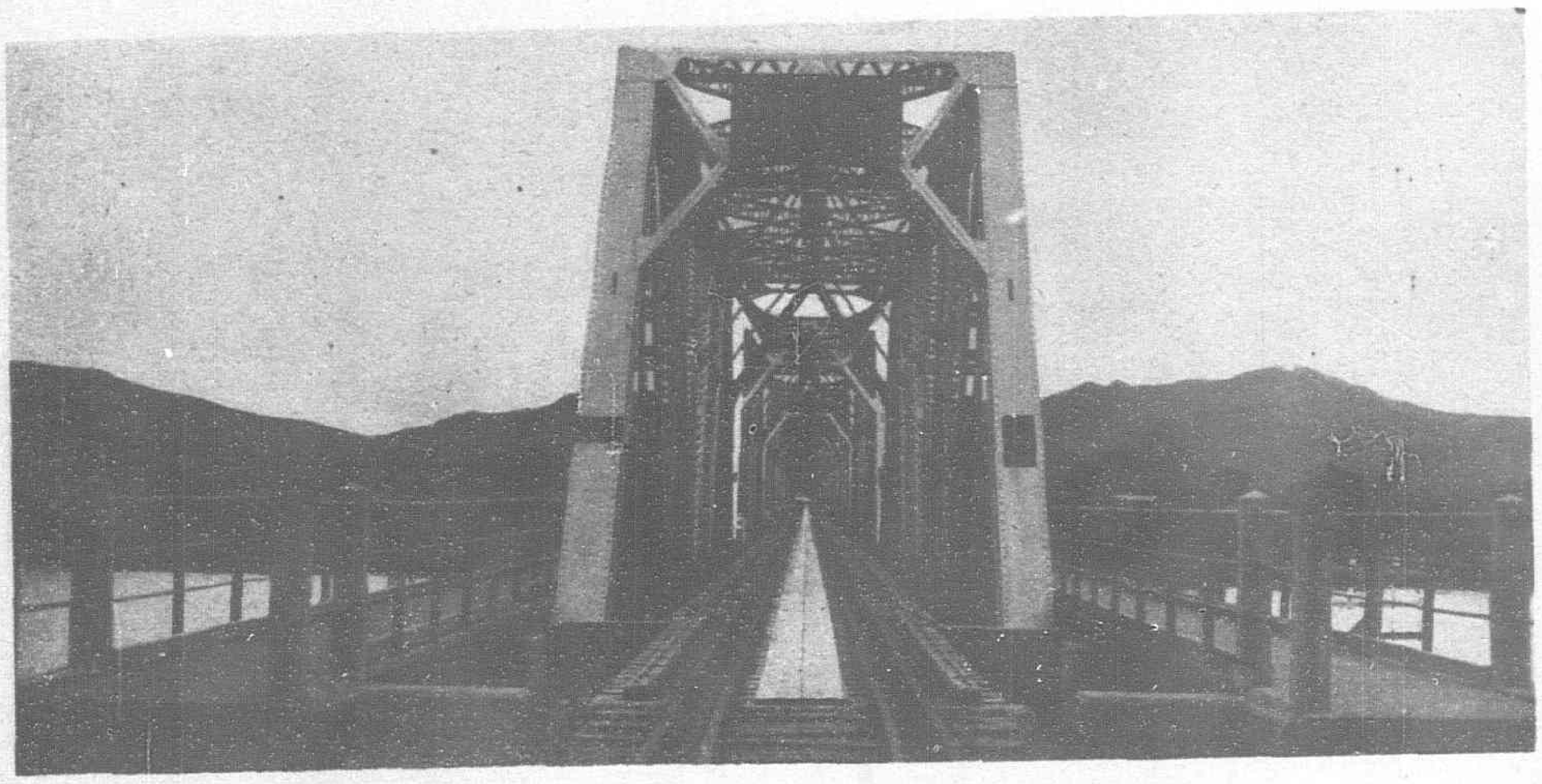
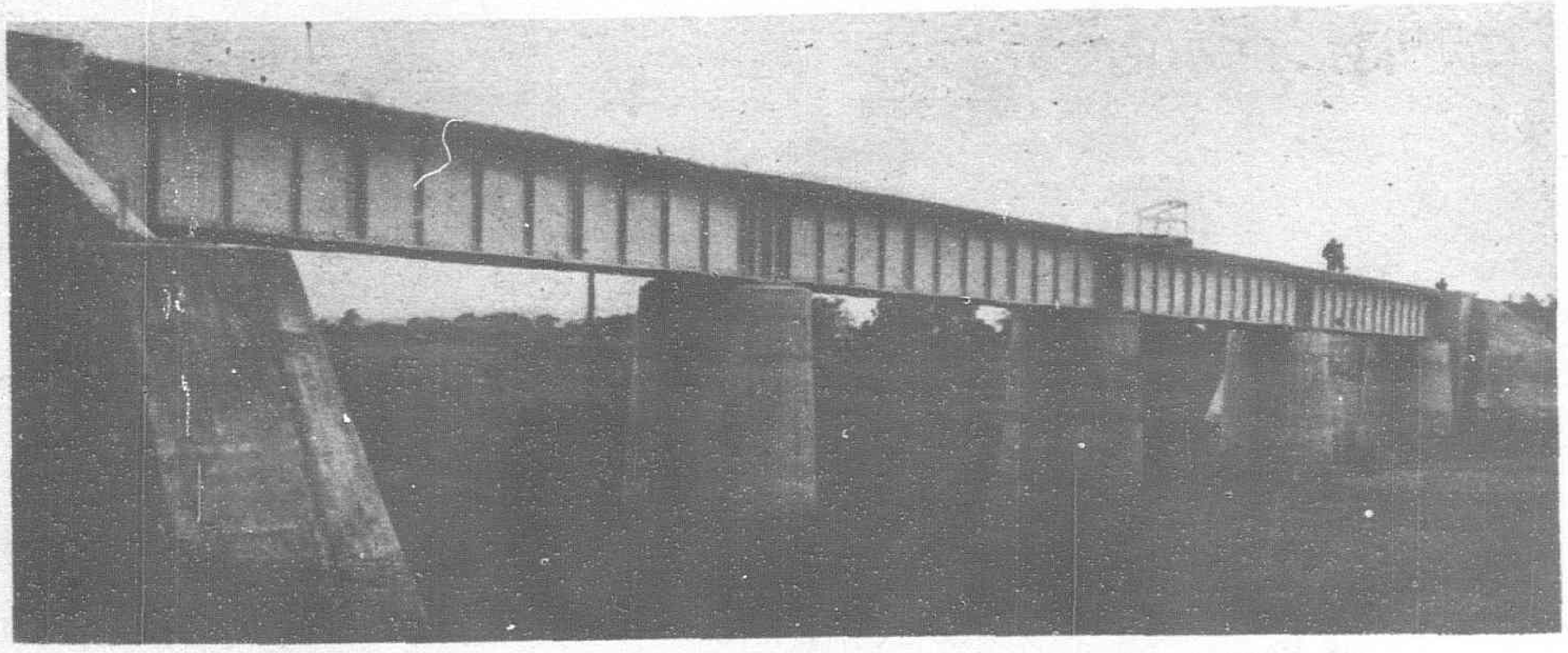
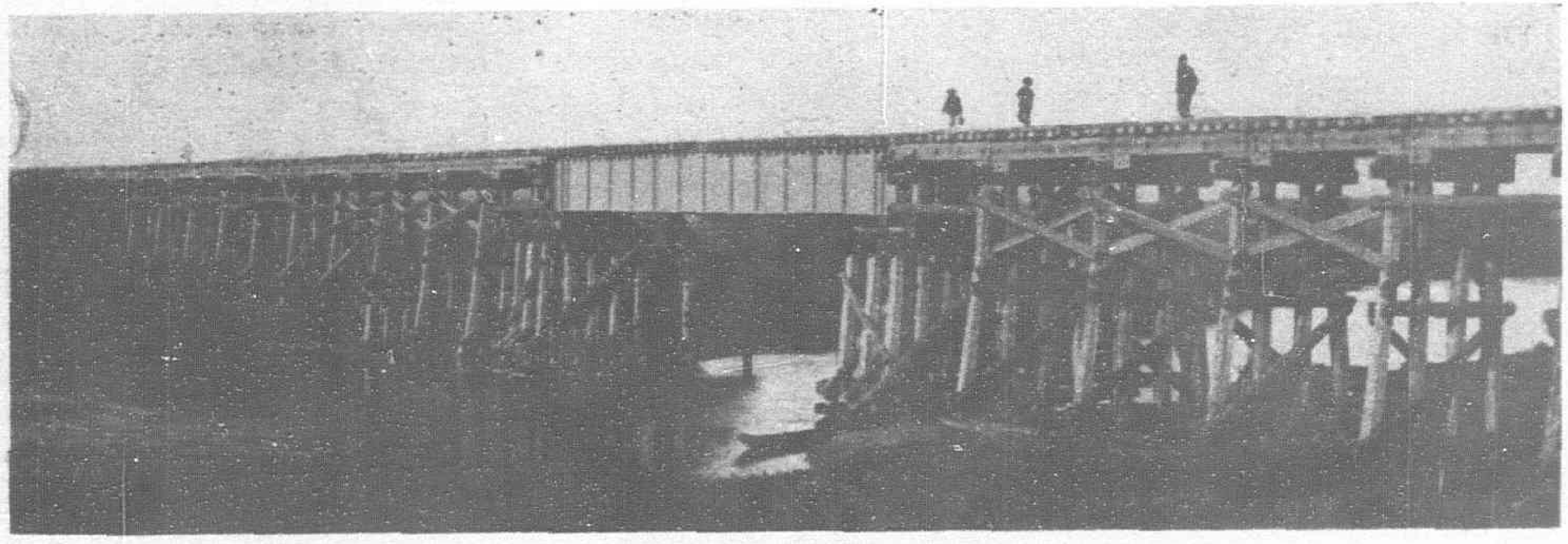
* *Manchurian Monitor.*



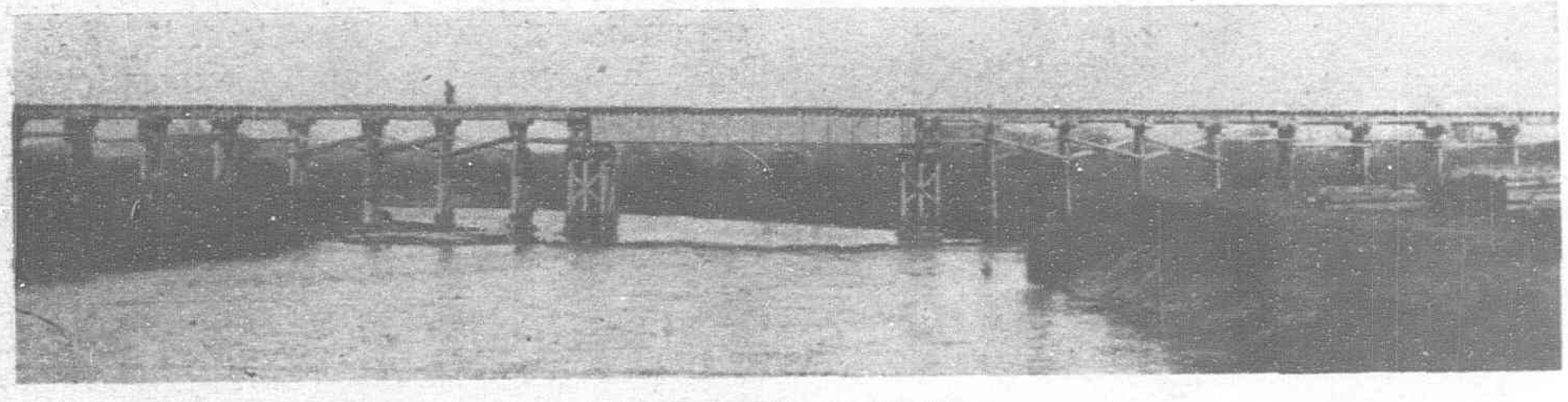
Kirin-Tunhua Railway Bridge Over the Sungari River



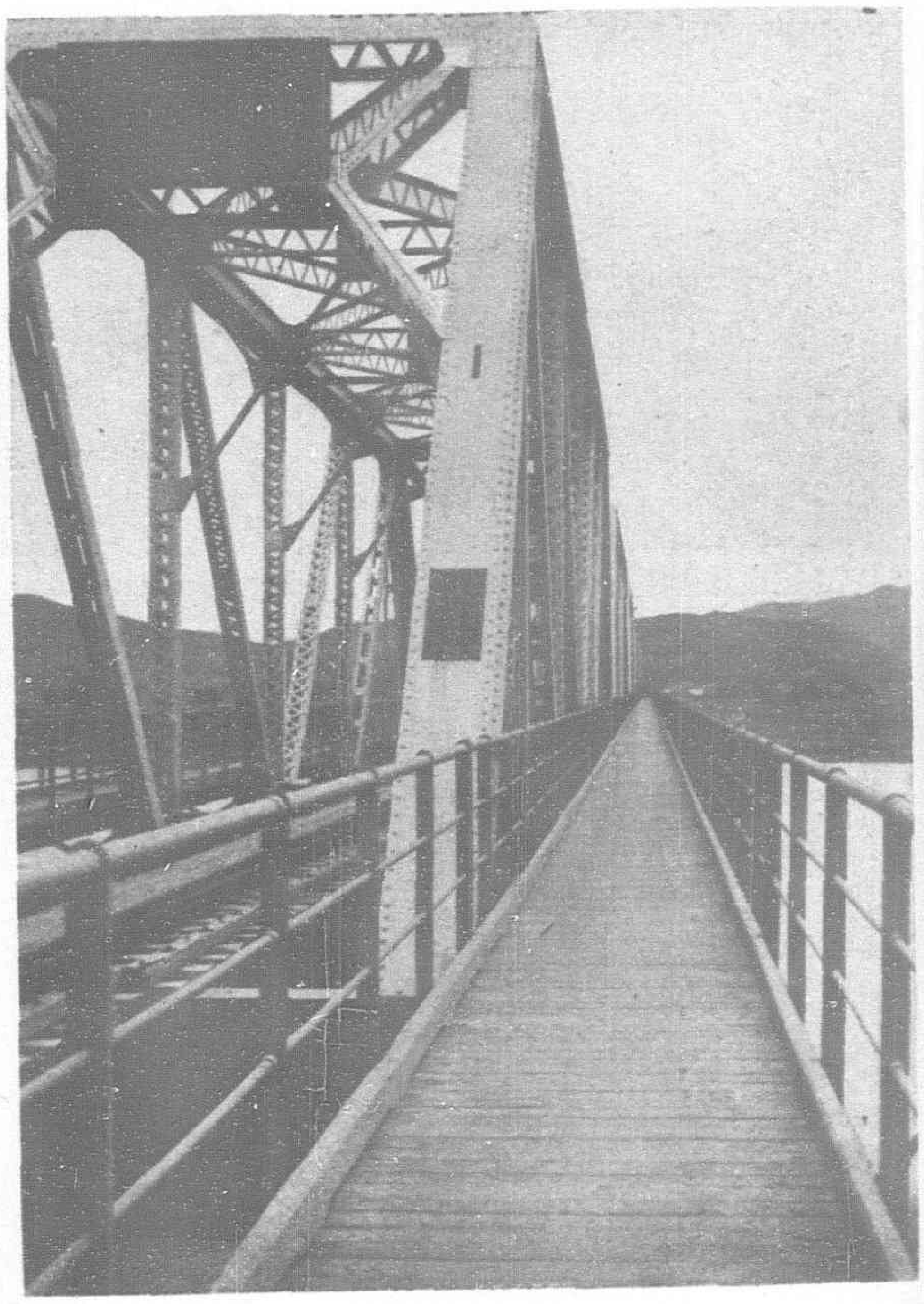
Bridge Over Bottom Lands Approaching the Sungari River



Ayaho Railway Bridge



Ayaho Railway Bridge



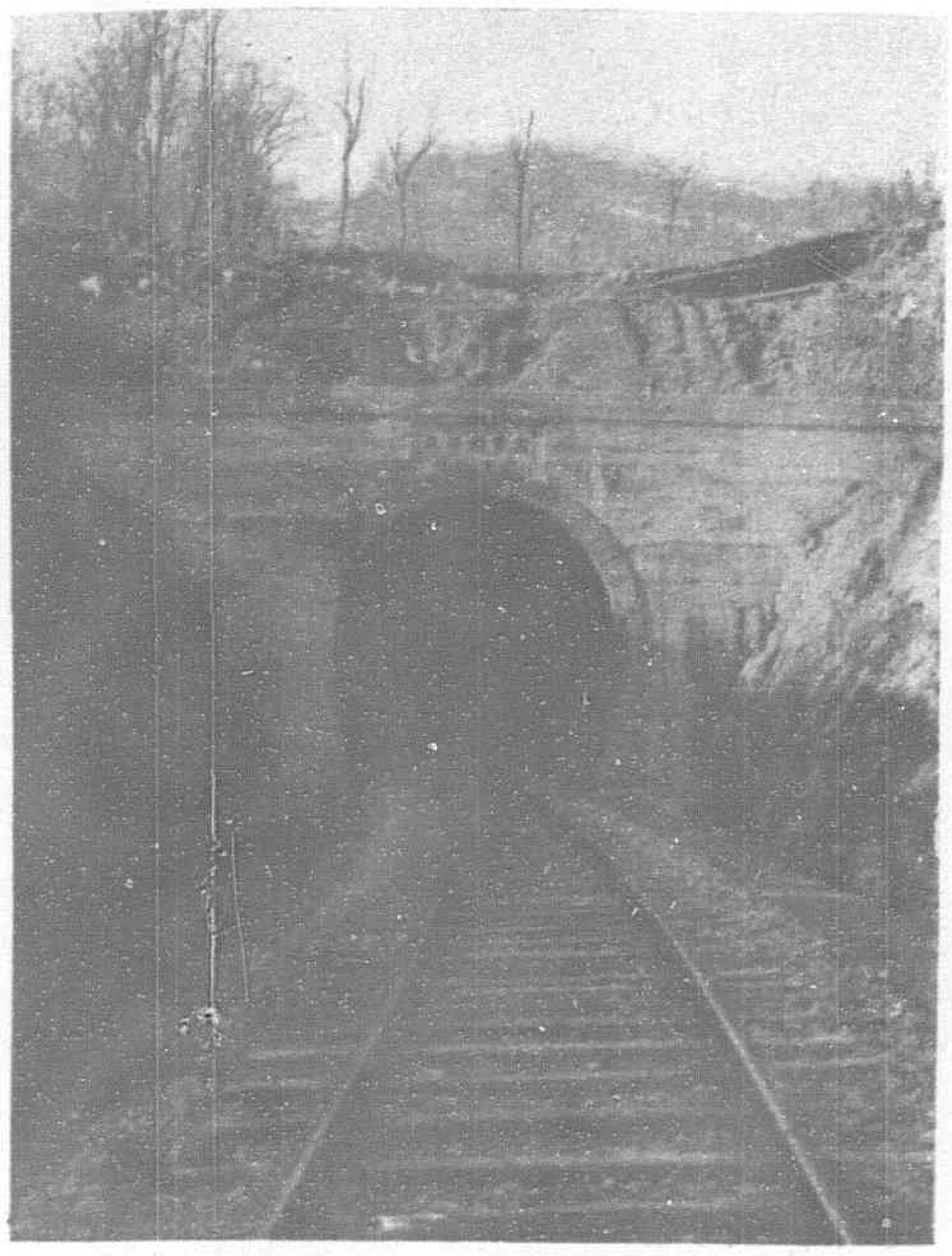
End View, Sungari River Bridge

put forward until 1918. From the latter year, owing to a number of circumstances, it became again one of the foremost questions of Manchurian railway construction. On June 18, 1918, a preliminary agreement was signed between a group of Japanese banks (Japanese Mortgage Bank, Bank of Chosen and Bank of Taiwan) and the Peking Ministry of Communications for a loan to be granted to China for the construction of the Kirin-Hoiren Railway. This agreement was to be ratified after six months after signing, after which it was proposed immediately to proceed to the construction of the railway, and surveying parties were sent out for preliminary work.

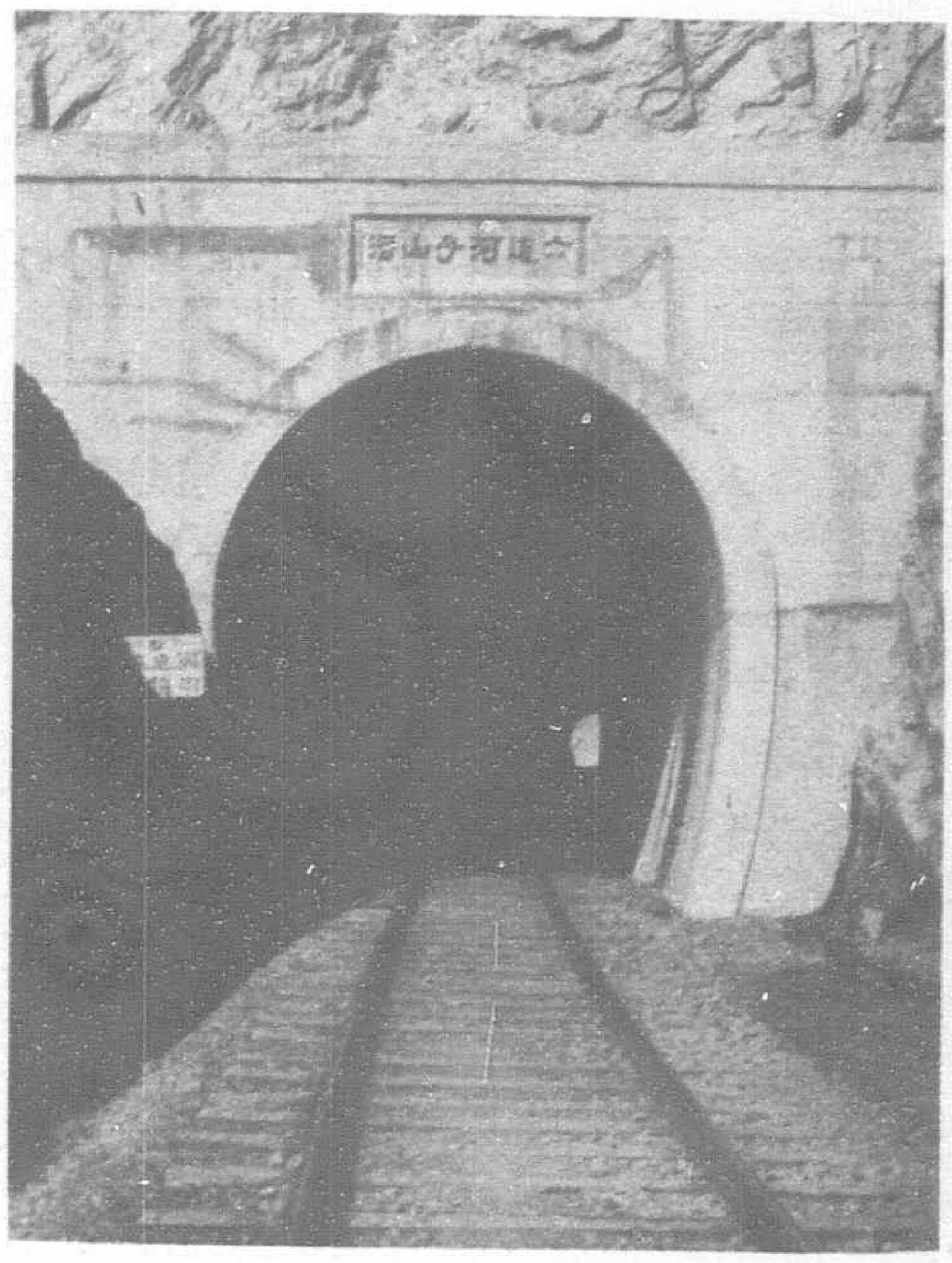
Simultaneously the said bank paid to the Chinese government an advance of Y.10,000,000 (for preparatory work prior to the construction on account of the future loan). However, owing to political complications in China, the proposals for the beginning of the construction of the line could not be put into effect. The advance itself, which China had received from Japan, was spent not according to its destination, provided by the original agreement with Japan, but for other purposes. Negotiations regarding the Kirin-Hoiren railway were resumed in 1925 only.

In May, 1925, the South Manchurian Railway Company applied to Marshal Chang Tso-lin that it be granted the right of constructing the Kirin-Tunhua Railway. Chang Tso-lin took this matter up with the Ministry of Communications in Peking. As a result, direct negotiations were opened between Mr. Yeh Kung-chow, at the time Minister of Communications, and Mr. Matsuoka, Director of the South Manchuria Railway Company. In the same year an agreement was signed between them according to which the construction of the railway was intrusted to the South Manchuria Railway (acting as contractor), which also temporarily assumed the construction expenses. According to preliminary estimates, the construction cost was calculated at Y.18,000,000, which were advanced to China by Japanese banks in the form of a loan at 9% per annum. Under the agreement China was to determine the term for redemption of this loan herself, but the reservation was added, that should this not be effected within the term of one year after the completion of the construction of the railway, the loan should be redeemed during the period of 30 years from the said moment. Until a complete liquidation of China's debt under this loan, the chief cashier of the railway should be a Japanese. The agreement provides that in future the new railway shall be managed conjointly with the Kirin-Changchun Railway.

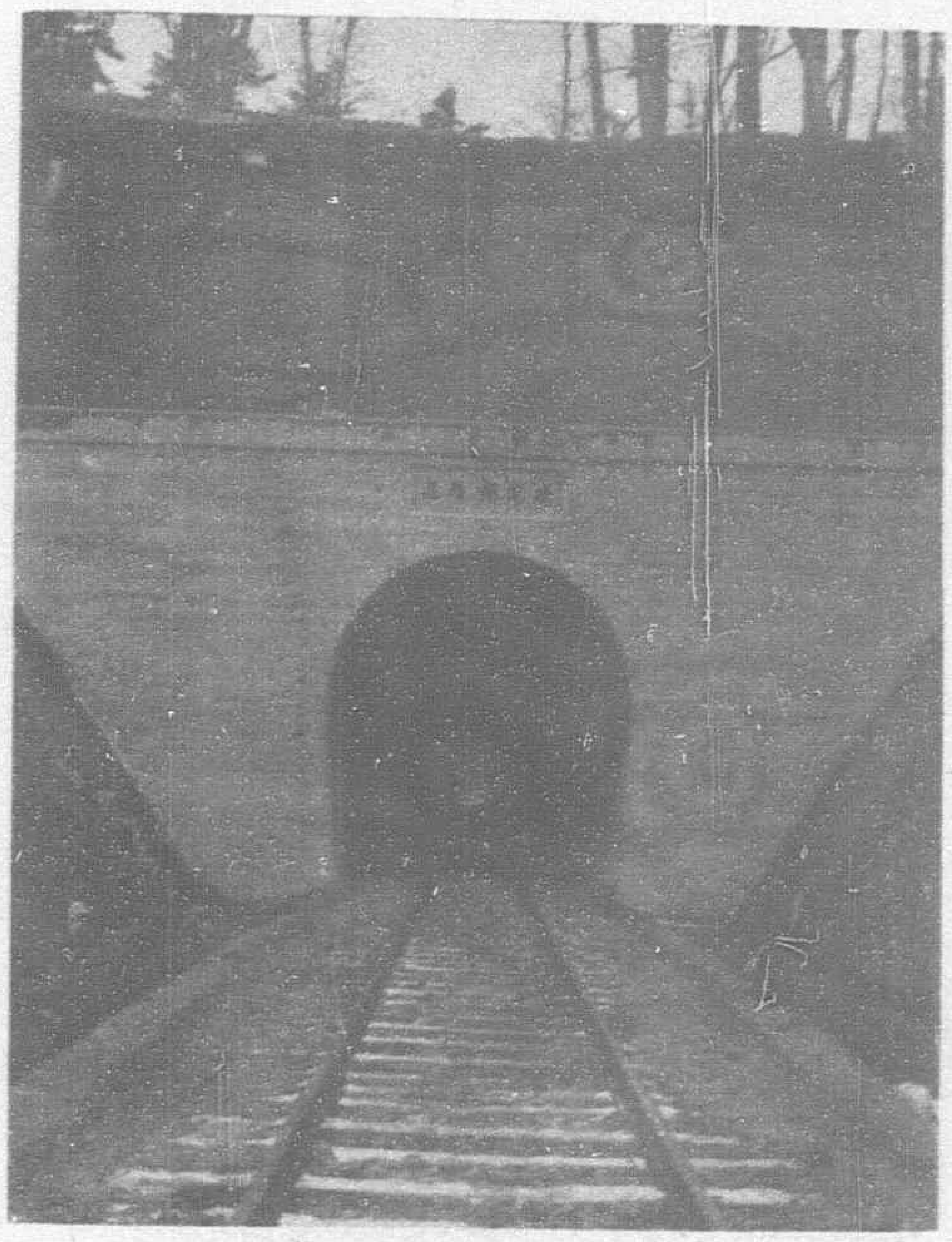
The agreement entered into with Japan was published on October 20, 1925, and on January 26, 1926, the administration of the new railway was opened in the head office of the Kirin-Changchun Railway. The Japanese engineer Tabe-Toshio was appointed



Laoyehling Tunnel



Liudaohotze Tunnel



Weihuling Tunnel

chief engineer in charge of technical work, and construction of the new railway was begun in May, 1926.

The line was completed to Tunhua in autumn, 1928, and from the month of October of the said year through passenger and freight traffic over the entire line was opened from Kirin to Tunhua. All more or less responsible work was effected by Japanese contractors under the supervision of Japanese engineers. The final cost of the construction amounted to Y.24,000,000.

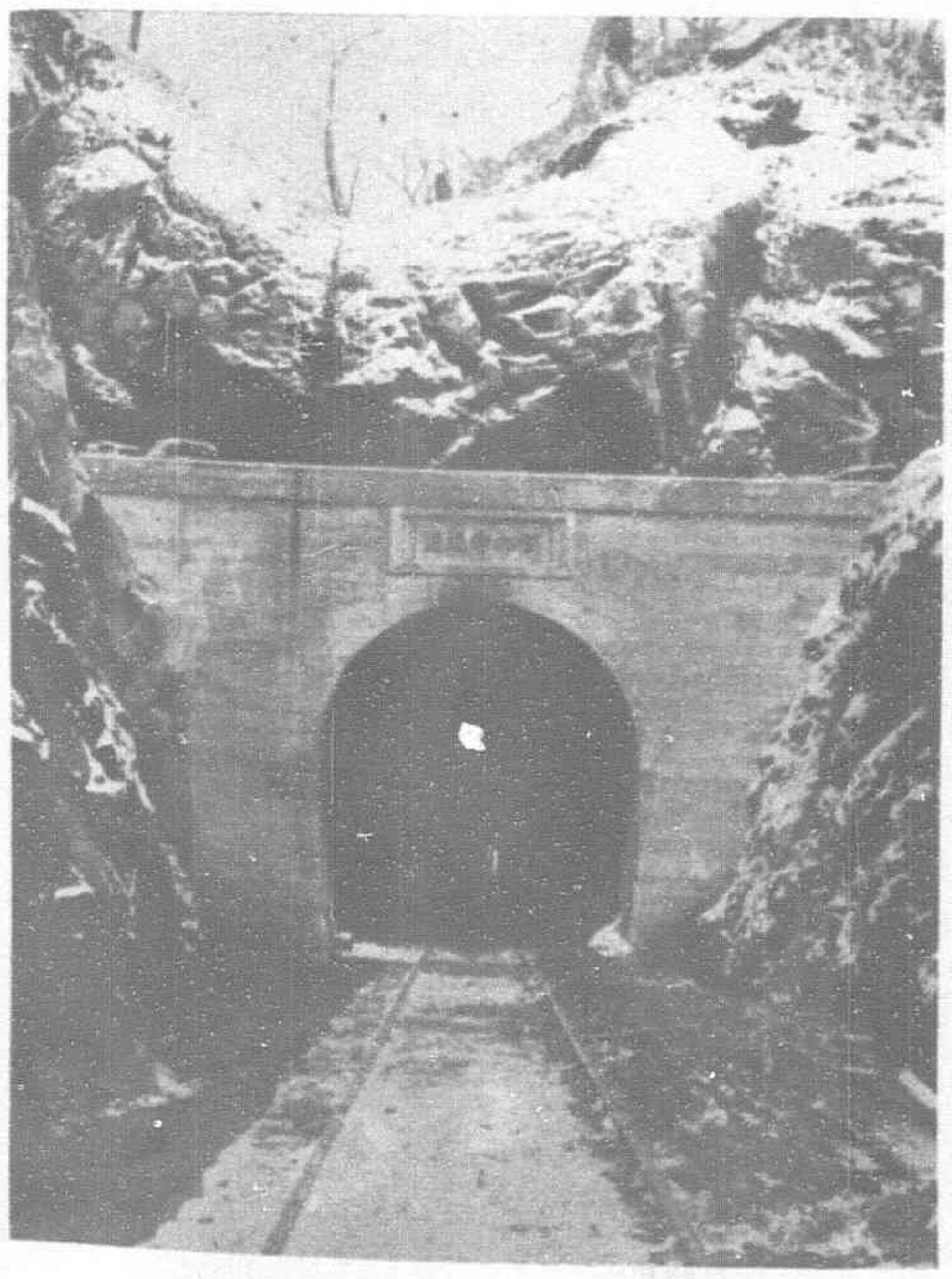
The Kirin-Tunhua Railway begins at the city of Kirin, crosses the Sungari river (at Tuangshantze) and from there proceeds in an easterly direction along the Maniuho river to the Laoyehling mountain range, which stretches from the north-east to the southwest on the border between the districts of Kirin and Emu.

The highest elevations of this range are the Chingling, Haichingling and Tangtalatze. The Kirin-Tunhua Railway crosses the Laoyehling range by a tunnel. After the latter the railway passes through the Lafaho plain and enters into a forest region, and after running through Chiaho, Chingling, Tashaho and other points, it reaches the city of Tunhua. Generally speaking, the greater part of the profile of the railway is mountainous, excepting the above mentioned Lafaho plain and the nearest surroundings of Kirin. The greater part of the mountains is covered with dense virgin forests. All this country is intersected with rivers—in the west the Maniuho river and in the east the Chiaoho.

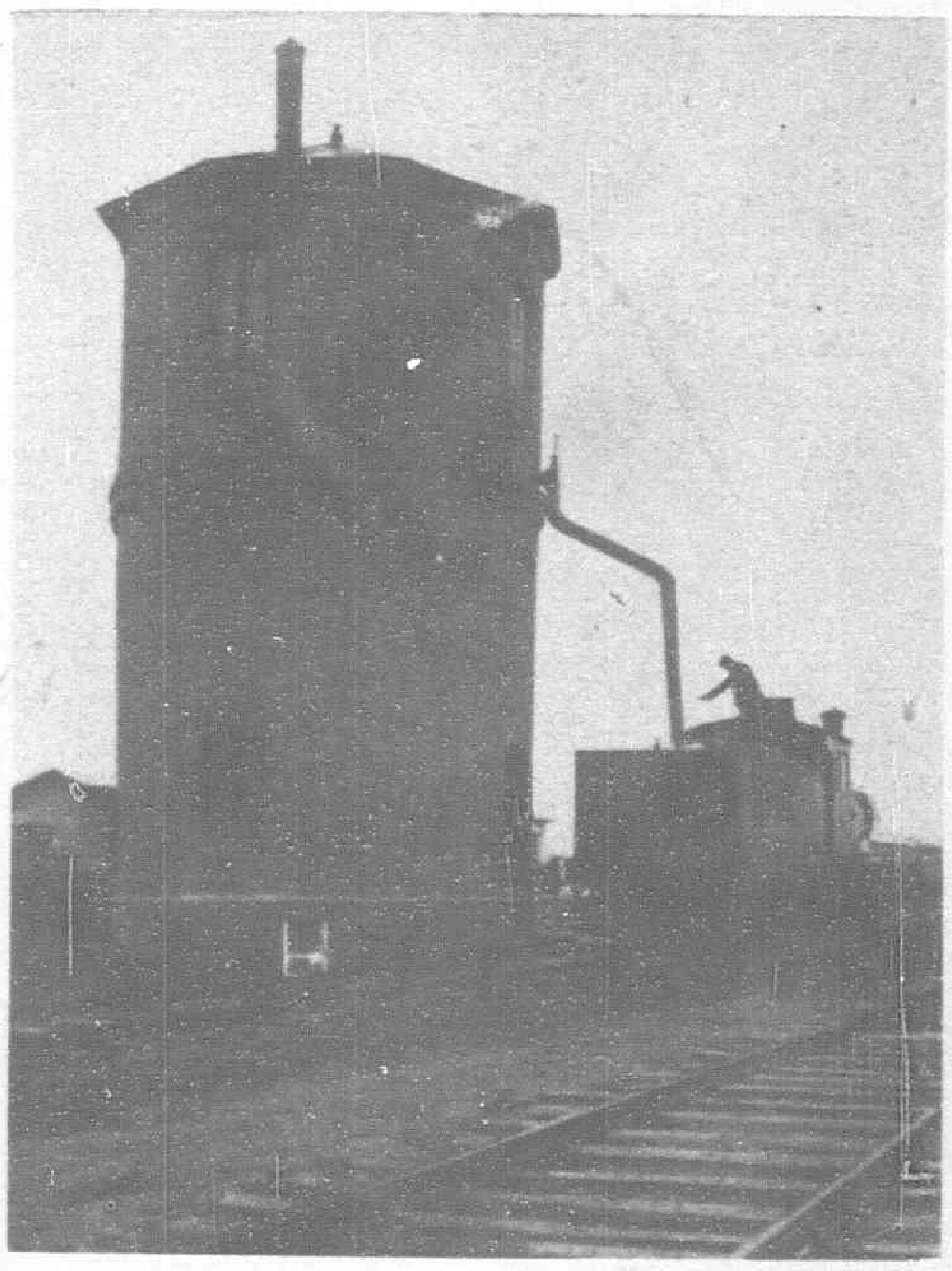
The railway is of the same Chinese standard gauge of 4 feet 8.5-in. as the Kirin-Changchun Railway. Its length is 210 kilometers.

On the line there are the following 17 stations (shown are the distances, number and extension of station sidings and principal constructions) :

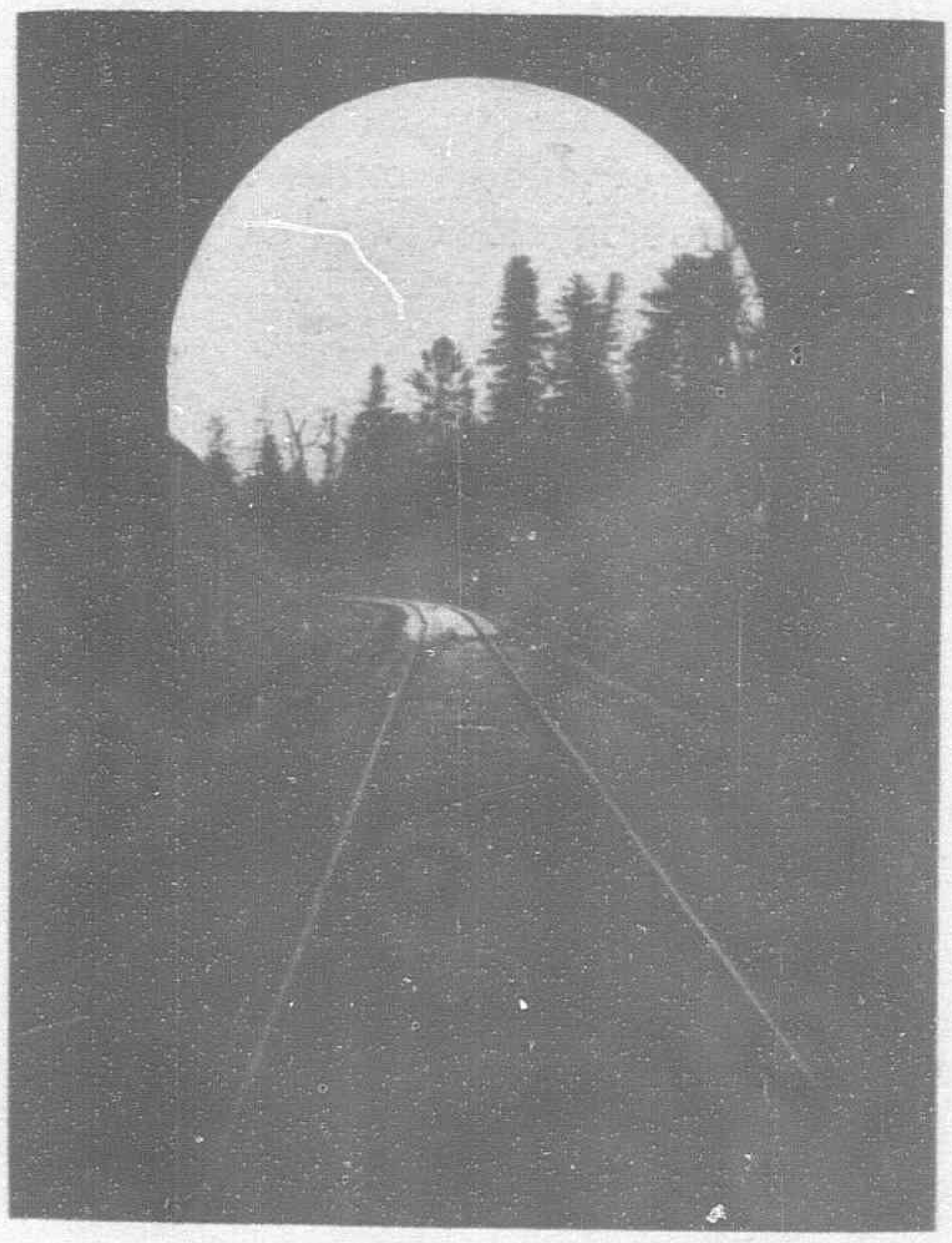
Denomination of stations	*Distance in km.*		*Number and length of station sidings*	*Depôts (roundhouses) and water-towers*
	From Kirin	*Between stations*		
Kirin	—	—	Common sidings with Kirin-Changchun R-ly	Depôt and water tower
Lungtanshan	4.2	4.2	2 long, 700 m. each, 1 short of 300 m.	—
Chienmufeng	18.5	22.7	2 long, 700 m. each 1 short of 300 m.	—
Ehomu	20.6	43.3	4 long, 700 m. each, 1 short of 300 m.	Water tower
Liutaohotze	11.6	54.9	1 long of 700 m., 1 short of 300 m.	—
Laoyehling	10.3	65.2	2 long, 700 m. each, 1 short of 300 m.	Water tower
Siaokuchientze	19.2	74.4	2 long, 700 m. each, 1 short of 300 m.	—
Lafa	10.9	85.3	1 long of 700 m., 1 short of 300 m.	—
Chiaoho	12.4	97.7	6 long, 1 short of 400 m. and branch to coal mines	Depôt and water tower



Whang Sungdien Tunnel



Water Tank at Lindaoho Station



Approach to Weihuling Tunnel

Lungtanshan Station

Laoyehling Station

Denomination of stations	*Distanee in km. From Kirin*	*Distanee in km. Between stations*	*Number and length of station sidings*	*Depôts (roundhouses) and water-towers*
Luishuhotze	19.9	117.6	2 long, 700 m. each, 1 short of 400 m.	—
Erhtahotze..	14.6	132.2	1 long of 700 m., 1 short of 400 m.	Water tower
Huanghuasingtientze ..	10.0	142.2	1 long of 700 m., 1 short of 400 m.	—
Weihuling	14.7	156.9	3 long of 700 m.each, 1 short of 400 m.	—
Huangniho	16.8	173.7	2 long, 700 m. each, 1 short of 400 m.	Water tower
Tsulikow	16.8	190.5	2 long, 700 m. each, 1 short of 400 m.	—
Taipingling	10.5	201.1	1 long of 700 m., 1 short of 400 m.	—
Tunghua	9.4	210.4	6 long, 700 m. each, 2 short of 400 m.	Depôt and water tower

The following are the three most important stations of the Kirin-Tunhua Railway: Kirin, Chiaoho and Tunhua.

From Chiaoho station in the end of 1928 a narrow gauge branch, 10 kilometers long, was constructed to the Yuntzeshan coal mines.

This branch was built exclusively at the initiative of the Chinese side in order to provide the railway with its own coal. In the first months of its operation the railway used Fushun coal exclusively.

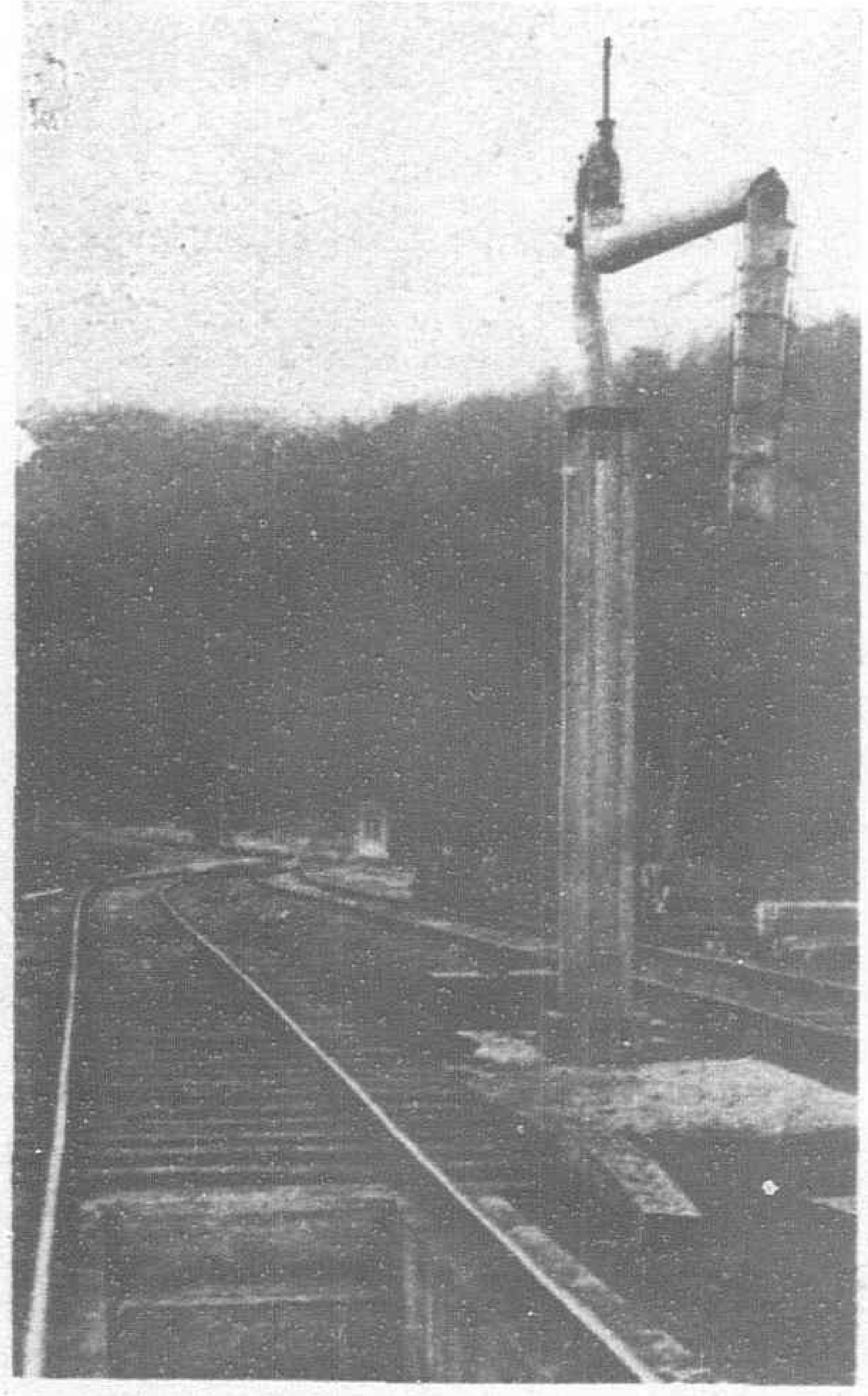
For the time being the Kirin-Tunhua Railway is but inadequately supplied with rolling stock. In the beginning of the current year its rolling stock was as follows :

Denomination	*Number*
Locomotives Nos. 501—506	6
Passenger coaches of Mixed I and II class	2
Passenger coaches III class..	12
Mail vans	2
Cars for train crews	6
Freight cars, with iron roofs, with carrying capacity of 30 tons each, Nos. 1201—1235	35
Cars for transportation of coal, with loading capacity of 30 tons each, Nos. 1601—1632	32
Open platforms with loading capacity of 15 tons each . ..	20

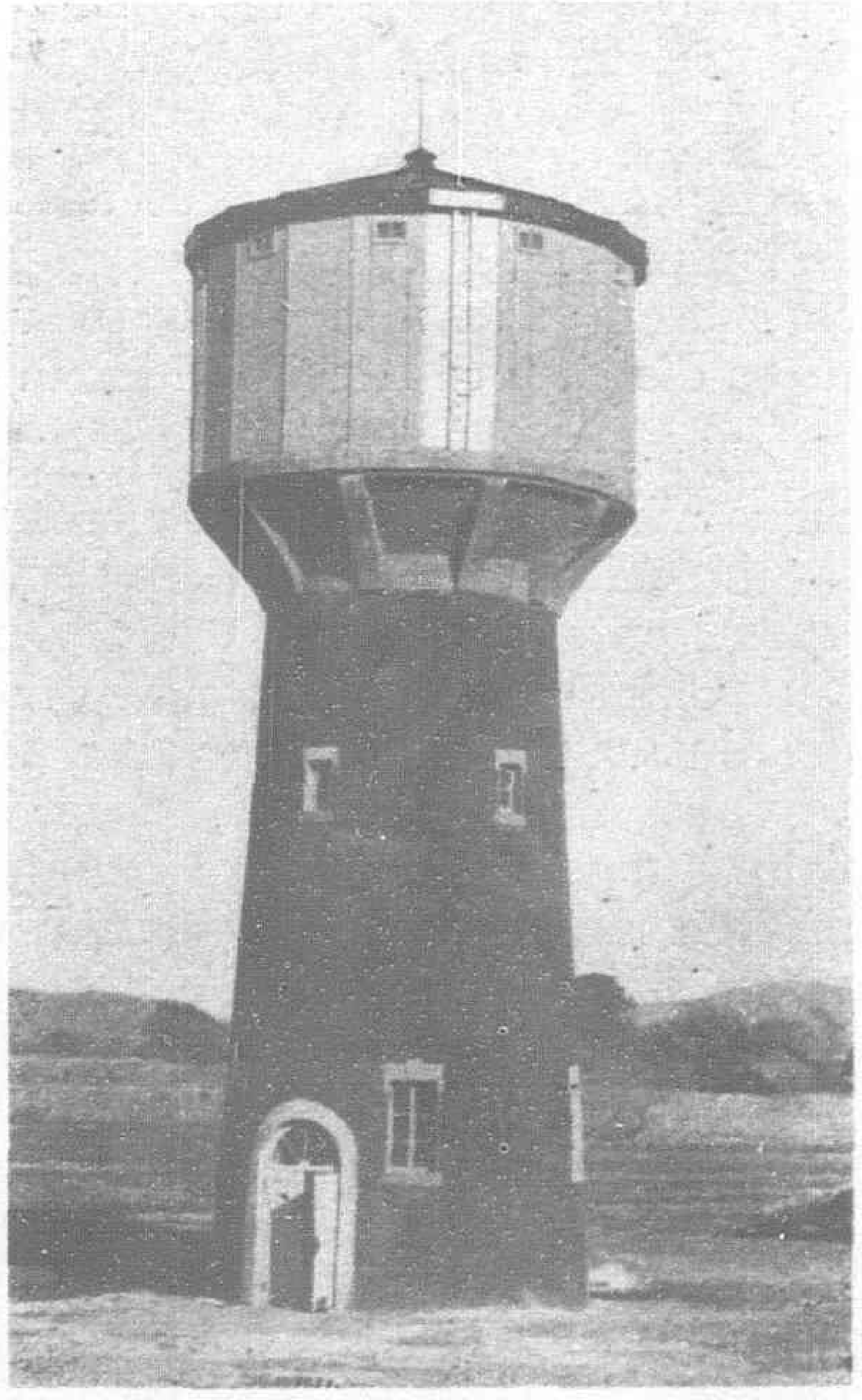
In addition to the above mentioned rolling stock about 32 cars with a loading capacity of 20 and 30 tons have been transferred to the Kirin-Tunhua Railway from other Chinese Railways (Peking-Mukden, Peking-Suiyan, Peking-Hankow, Tientsin-Pukow and others). Including these cars the Kirin-Tunhua Railway disposes therefore of a rolling stock of about 120 freight cars.

The management of the railway expects that during the first years of its operation it will carry, according to conservative estimates, from 7,000 to 8,000 cars of timber material per annum, which will be equivalent to 200,000—240,000 tons.

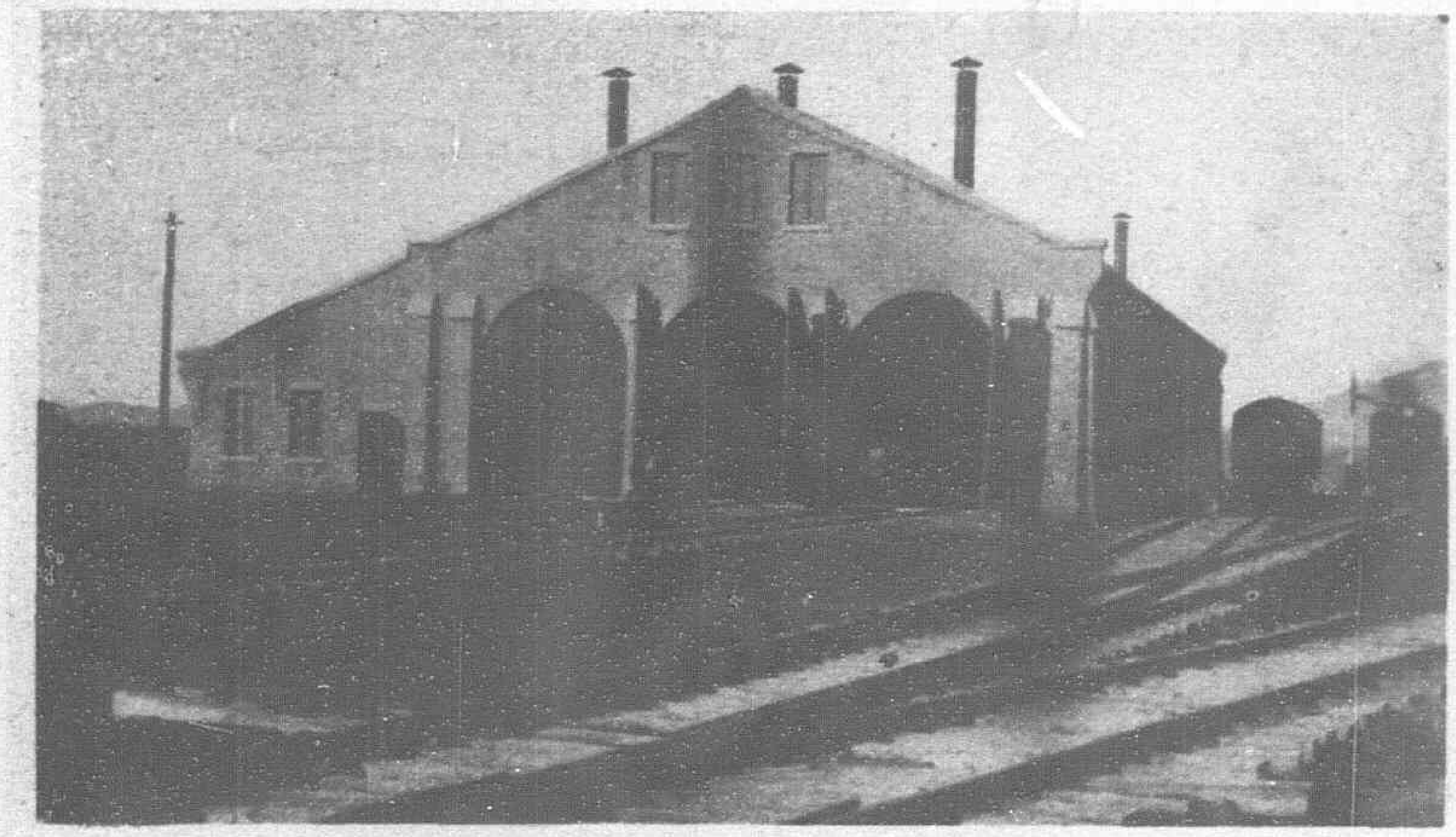
It was already stated above that it is proposed to extend the Kirin-Tunhua Railway further to the east to the boundary with North Korea, and later gradually to put into effect the construction of a number of new lines, connected with the Kirin-Korean railway. All this will form the beginning for the above mentioned new trunk system in Manchuria.



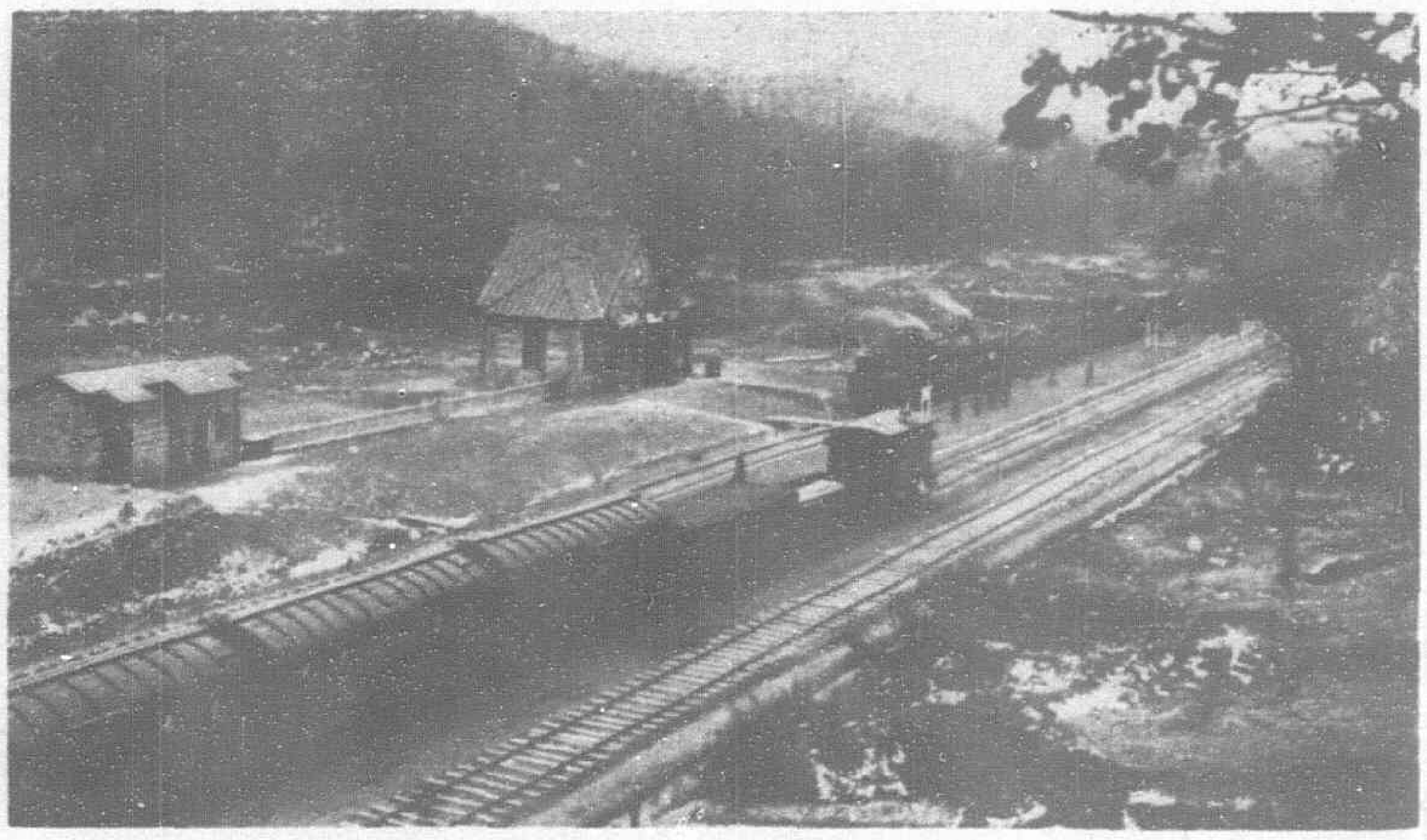
Stand Pipe, Laoyehling Station



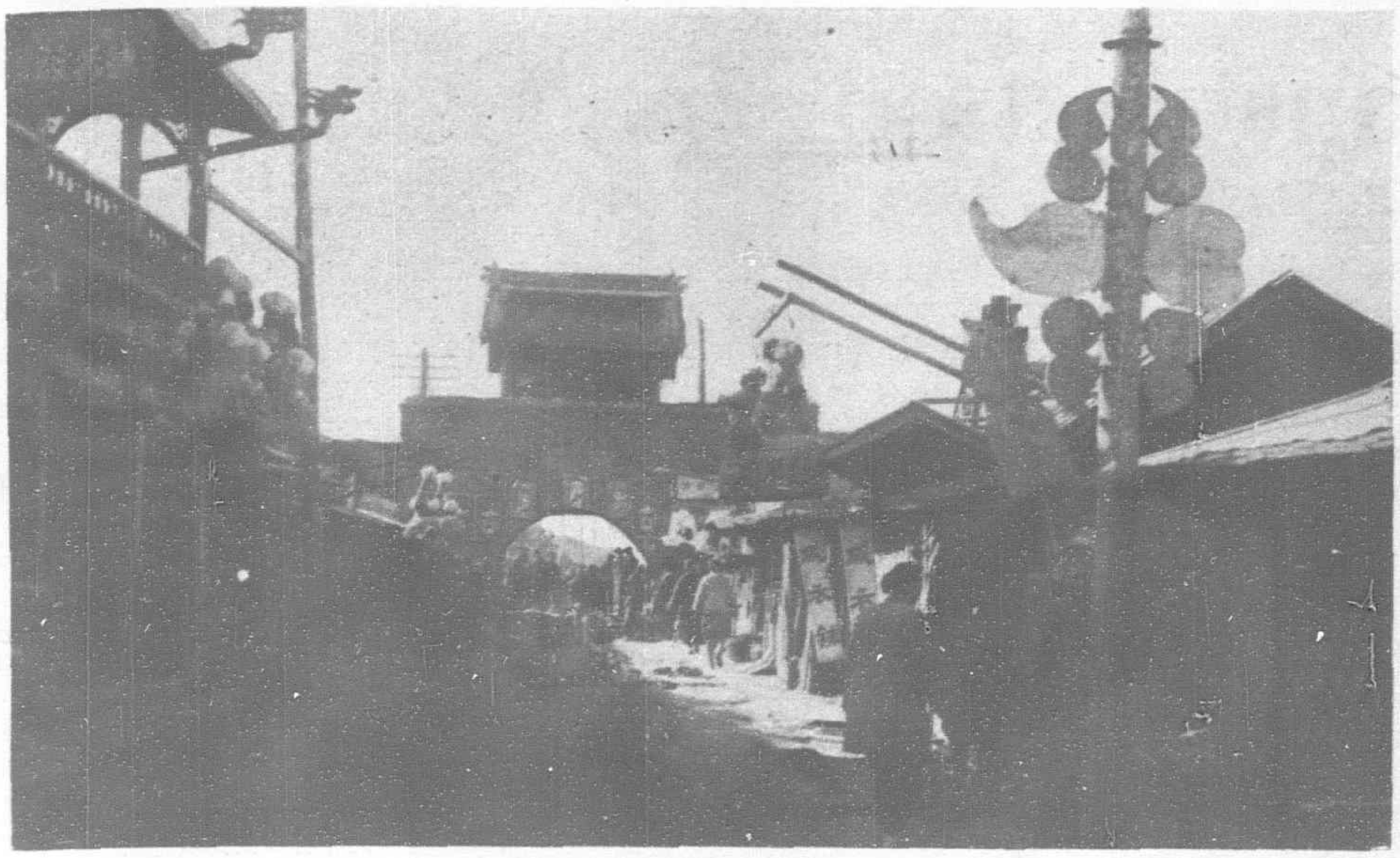
Water Tower, Yaoho Station



Round House: Yaoho Station



Erhdaohotze Station



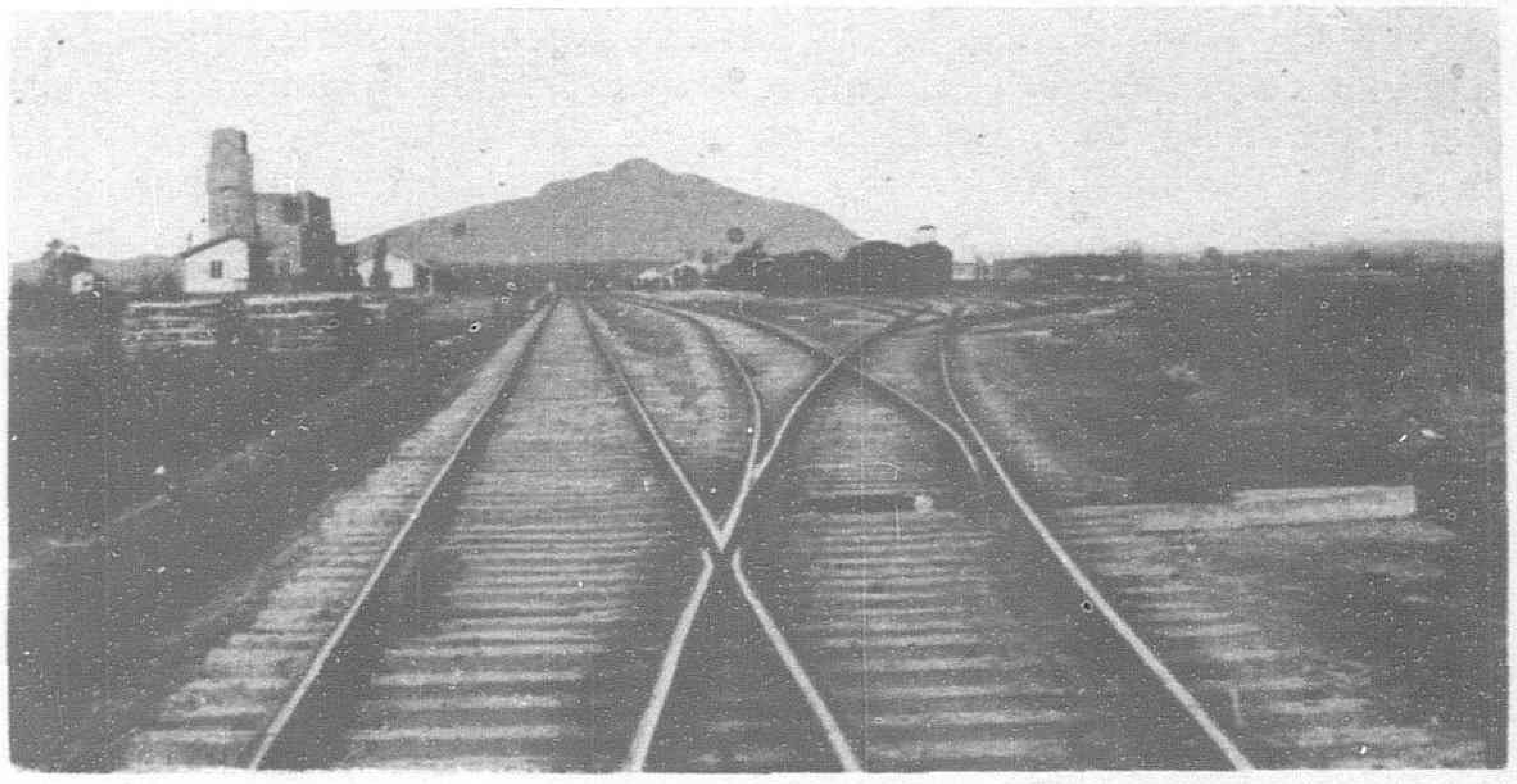
Street in Tunhua

The following lines are planned :—

(*a*) Extension of the Kirin-Tunhua Railway from Tunhua to the Korean frontier	224.0 km.
(*b*) Construction of Changchun-Talai Railway	209.6 ,,
(*c*) Construction of Taonan-Solun ,, ...	225.0 ,,
(*d*) Construction on Yanchi-Hailin ,, ...	265.0 ,,
(*e*) Construction of Kirin-Wuchang ,, ...	240.0 ,,

The construction of all these railways will call for the expenditure of from 120 to 130 million yen according to preliminary estimates (Y.100—110,000 per kilometer).

It is proposed to extend the line from Yanchi to Hailin in future to Sansing, and the Changchun-Talai line to connect with the Taonan-Solun Railway. In the future the last mentioned railway will be extended to Hailar (So-Hai Railway), and from Hailar to Shihwei (Ha-Shi Railway) on the Argun river facing the Nerchinsky Zavod (Works) in Transbaikalia. It is also proposed to extend the Kirin-Wuchang Railway to Harbin.



Yaoho Station Yard

All these railways taken together will form the future new trunk system, which will radically change the existing transportation conditions in Manchuria, and also in part modify the routing of the goods in the country, as will be shown below.

In the first place it will be necessary to construct the extension of the Kirin-Tunhua Railway to the east.

The existing plans provide for the following tracings of the new line from Tunhua : Tunhua-Tachiao - Lengshuichuitze - Haerphaling range (boundary between Yanchi and Tunhua districts)-Fangmilatze-Liangpingtai-Kunniulatze-Wangpayaotze - Wungshenglatze - Wuhutingtze (2 tunnels will have to be built here)-Yuishuchuan-Laotowkow.

The distance from Tunhua to Laotowkow is about 118 km. (according to other estimates—106 km.).

From Laotowkow there may be two variations :

1. From Laotowkow at present there already exists a narrow-gauge "Tien-Ti" Railway (2-ft. 6-in. gauge), operated jointly by the Nammansui Taikyo and the Kirin government, which runs south-east to the Korean boundary (Tienposhan line), for a distance of 122.5 km. from the terminal station of Tienposhan and 110.5 km. from Laotowkow, and afterwards, crossing the Tumen river is continued on Korean trerritory (Tumenkiang railway) for a distance of 40.7 km.

The Tienposhan railway was built between 1922 and 1924. It has a branch to Yanchi about 10 km. long.

The Tumenkiang narrow-gauge railway was built between 1919-1924 by the Chinese-Japanese joint stock company Nammansui Taiko (Taising South Manchurian Co.). It runs on Korean territory along the Tumen river to the city of Hoiren (Kwainei).

There exists a project of directing the Kirin-Tunhua Railway from Laotowkow south-east to the frontier post of "Tifang" (on the Chinese side), which is also called Kaoshan. In such case it would pass through the following points : (stations of the Tienposhan railway) : Laotowkow, Chaoyangchuan, Lungchitsun, (large trade center, with a commercial port office and Japanese consulate), Tungcheniung, Chechangkang, Pataohotze, Shimentze, Kaishantun and the Tumenkiang river—Korean border. Over the Tumen river a large railway bridge has been constructed at this point in October 1927. It connects the Tienposhan line with Shansanfeng station of the Tumenkiang railway. The length of the entire Tumenkiang railway is 57.8 km. and from Shansanfeng to Hoiren—40.5 km. On this line are the following stations : Chiotzanho (Shansanfeng), Kampei (Chienping), Sinden (Sintien), Kakuho (Haopu), Koreichin (Kaolingchen), Sinkainei (New Horrieng Chinese—Sinhuining), Kwainei (also called Hoirien, or Hoiren, Huining in Chinese).

The Tien-Tu Railway it is proposed to buy out and transform into a normal gauge line.

From Hoiren a Japanese government railway, which was constructed in 1914-1917 being a part of the North Korean trunk system (Kankyosen—Gensan—Kwainei) runs to the port of Seishin, its length being 92.9 kilometers.

As soon as the Tunhua Railway is extended to Laotowkow, it will immediately be connected with the port of Seishin, in the beginning by a narrow gauge line (Tien-Tu railway of 151.2 km.), which, however, in the course of the next few years will be rebuilt into normal gauge. The distance from Tunhua to Seishin will in such case be equal to 118+50.5+92.9=361.4 km. (including the unbuilt section of 118 km. between Tunhua and Laotowkow).

(*Continued on page 43*).

Street in Tunhua

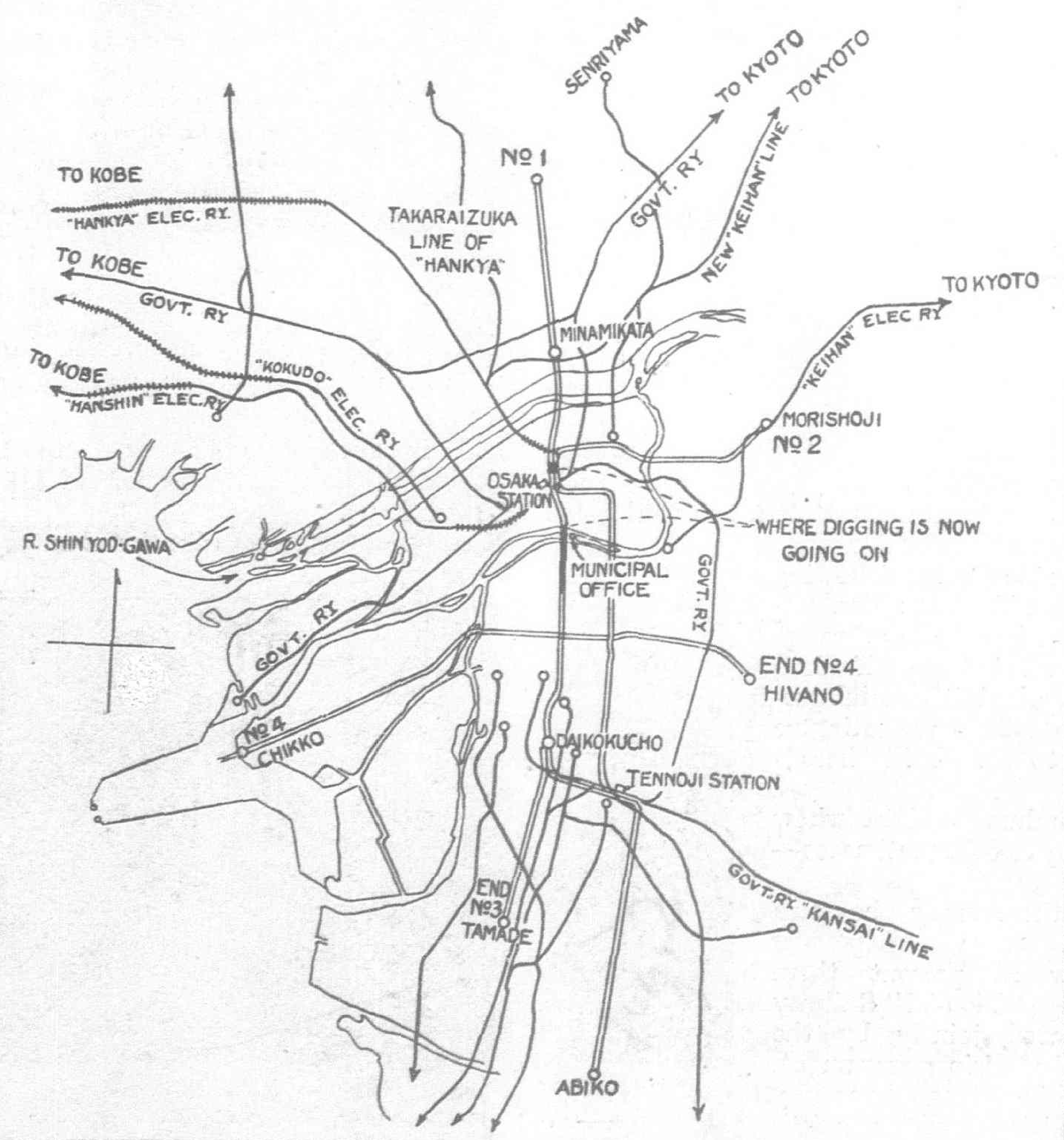
Subway Construction in Osaka

By EISABURO KUSANO

A SUBWAY is now under construction in Osaka to be completed some time early in 1932. It runs through the civic centers of the city from north to south for a distance of a little more than 10 miles. This is part of a Y.160,000,000 project, the Rapid Transit System, which is provided in the extensive city construction plan of this thriving harbor metropolis with a population of 2,400,000.*

Osaka is now building an underground railway which runs through the civic centre of the city from north to south for a distance of a little more than 10 miles. It is part of a Y160,000,000 project, the Rapid Transit System, which is provided in Osaka's extensive city construction plan. This 10-mile subway will open early in 1932. The building on the left is the Osaka Municipal Office. The construction work had just started when this picture was taken on July 18, 1930

Osaka is the center of a fine cobweb of highly developed interurban electric railways that radiate in all directions. There are two lines reaching Kyoto in the north; half a dozen lines go south, some of them extending to Nara and Wakayama, and there are three lines running to the west connecting the city with Kobe. In addition, there is the Government steam railway connecting Osaka with all of these neighboring cities and towns.



Sketch of Osaka, Showing New Subway Routes

The only regret of the people of Osaka as well as those passing through this city on their way from one place to another has been that these interurban electric railways have developed independently of each other; there have been no convenient traffic facilities connecting these lines. But the Rapid Transit System will link them all. The forthcoming inauguration of the 10-mile subway signifies the first milestone on the way to this goal.

One thousand men are now daily employed in the work. Ten 4-ton steam-hammers with 5,000 lbs. rams each are driving in sheet-panelling day after day. Meanwhile gasoline locomotives are kept busy hauling earth, in addition to hand-carts which are also used. The surplus earth is then transported by barges to be disposed in the reclamation work along the banks of the Neyagawa and the Tosabori-gawa.

Electric pumps are constantly in operation draining off the water in the excavated parts, especially in front of the Osaka Municipal office which stands on an island sandwiched between the Dojima-gawa and the Tosabori-gawa. Bricklayers are putting up walls in the meantime to prevent the inflow of water while cement mixers are in operation turning out the material with which to coat the walls.

In other sections, men are busy re-adjusting the innumerable underground pipes of the gas, water and sewage systems that run in all directions, often spanning the road; these have to be suspended across the excavated sections with special care.

All these undertakings are carried on at one and the same time under the direct control of the Obayashi-Gumi Builders of Osaka in accordance with the instructions issued by Mr. Shimizu, Engineer-in-Chief of the Rapid Transit System.

Outline of the System

The Rapid Transit System of Osaka is made up of four lines extending 33.87 miles in the aggregate total of length.

Line No. 1 runs from north to south in the center of the city, starting at Enokizaka, Toyotsu-gun, Osaka Prefecture, and ending at Abiko-machi, Sumiyoshi-ku, Osaka city, the total mileage being 12.4 miles.

Line No. 2 starts at Morishoji-machi, Higashinari-ku, Osaka, in the north eastern end of the new city.

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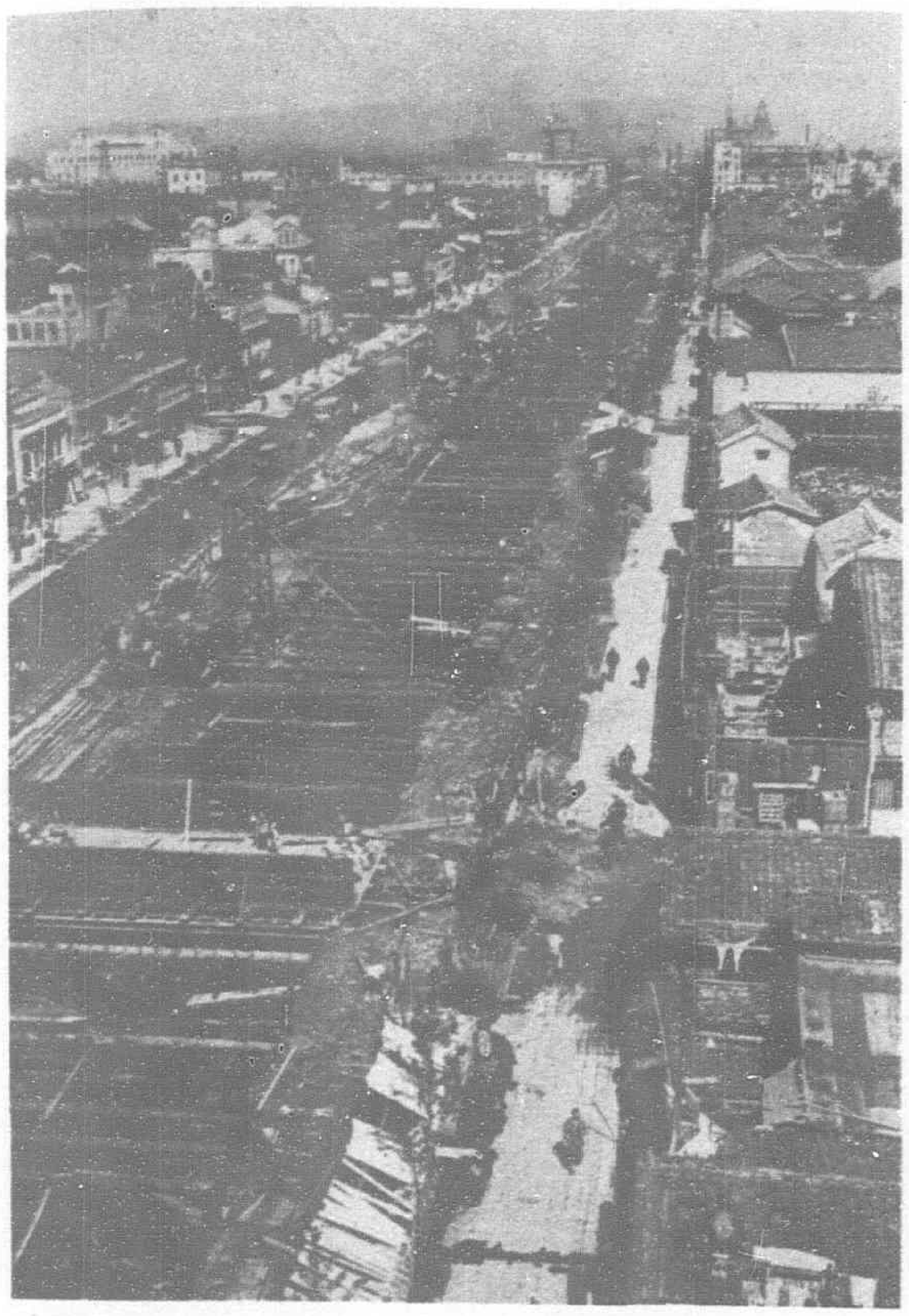
* Minute details of this Rapid Transit System were published in *The Far Eastern Review* of December, 1929.



General view; Looking north from the Saibara Building, showing pile prop of the sheet-panelling. (September 17, 1930)

It runs to the west to meet Line No. 1 in the neighborhood of the Osaka Station of the Government Railway and then runs south parallel to Line No. 1 on its eastern side. It ends at Tennoji, its length being 8.52 miles.

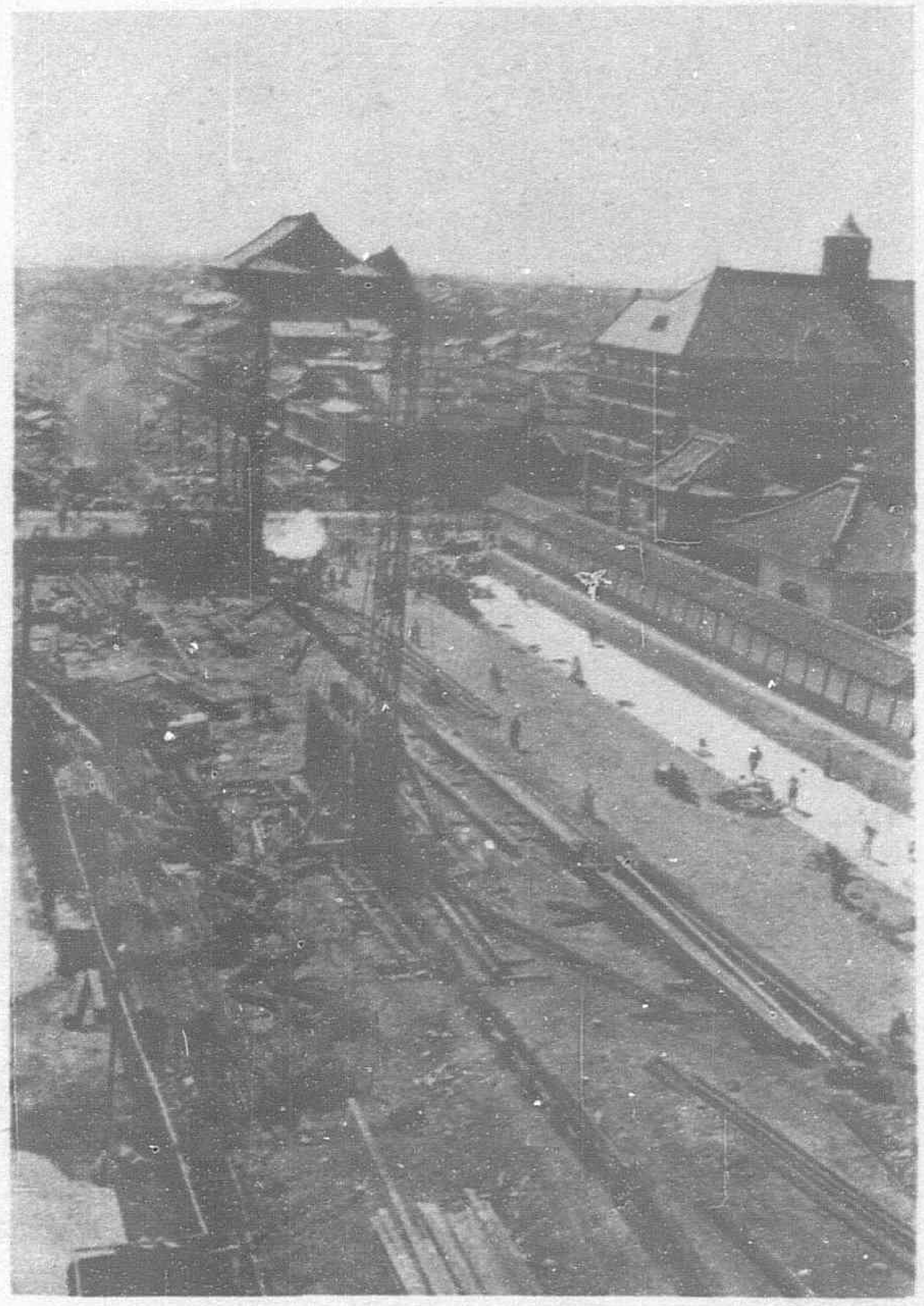
Line No. 3 runs for 2.31 miles, starting at Daikokucho on Line No. 1 near the latter's southern end, and extends straight south parallel to Line No. 1 for about one-third of its remaining length on its western side as far as Tamade-machi. southern end of the new city.

Line No. 4 begins on the waterfront of Osaka, at the main pier. It runs north-west across the old city and ends at Hirano, Nishiwaki-machi, in the mid eastern end of the new city. The mileage, 10.63 miles.

In view of the fact this is an extensive building program, the estimated cost running up to well over Y.160,000,000, it has been decided that the entire project be divided into three successive periods. During the first phase of the construction work, part of Line No. 1, between Minamikata and Abiko-machi, as well as parts of Lines Nos. 2 and 3 at such points where these lines join Line No. 1, are to be constructed at an estimated cost of a little more than Y. 77,000,000.

Of this work on Line No. 1, the actual construction, or rather digging, is now going on at two places, one at the northern side of the Osaka Station of the Government Railway, and the other, along the Midosuji highway, south of the Osaka Municipal Office.

Side by side with the subway construction at the Osaka Station, the station itself is now also under reconstruction at an estimated cost of Y.100,000,000. (Details of this reconstruction project of the Osaka Station were published in the *Far Eastern Review* in March, 1929.) The Rapid Transit System is to go underneath the new Osaka Station.

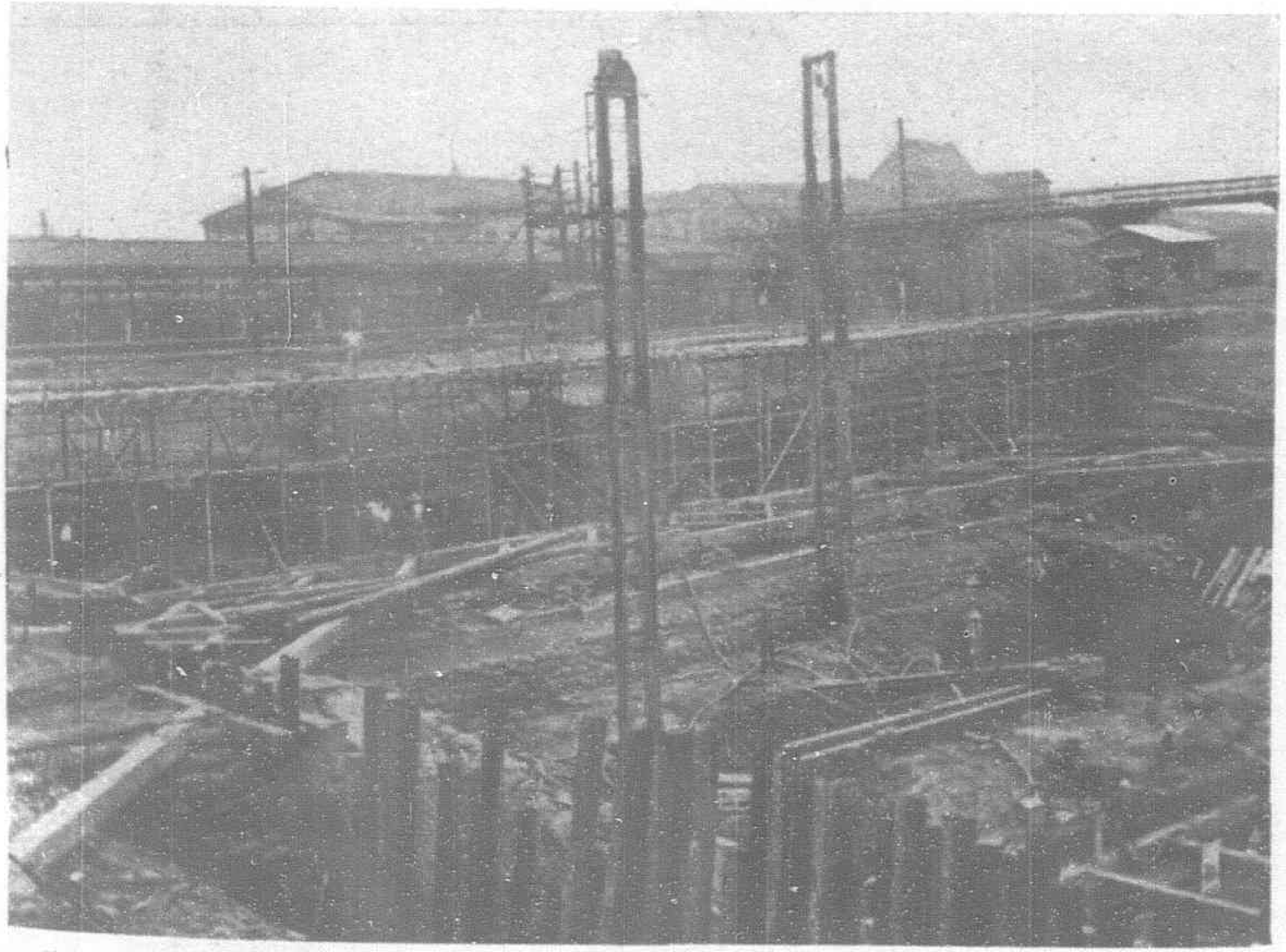


Looking south from the Saibara Building, showing two 4-ton steam-hammers with 5,000 lbs. ram each that drive in sheet-panelling. (September 17, 1930)

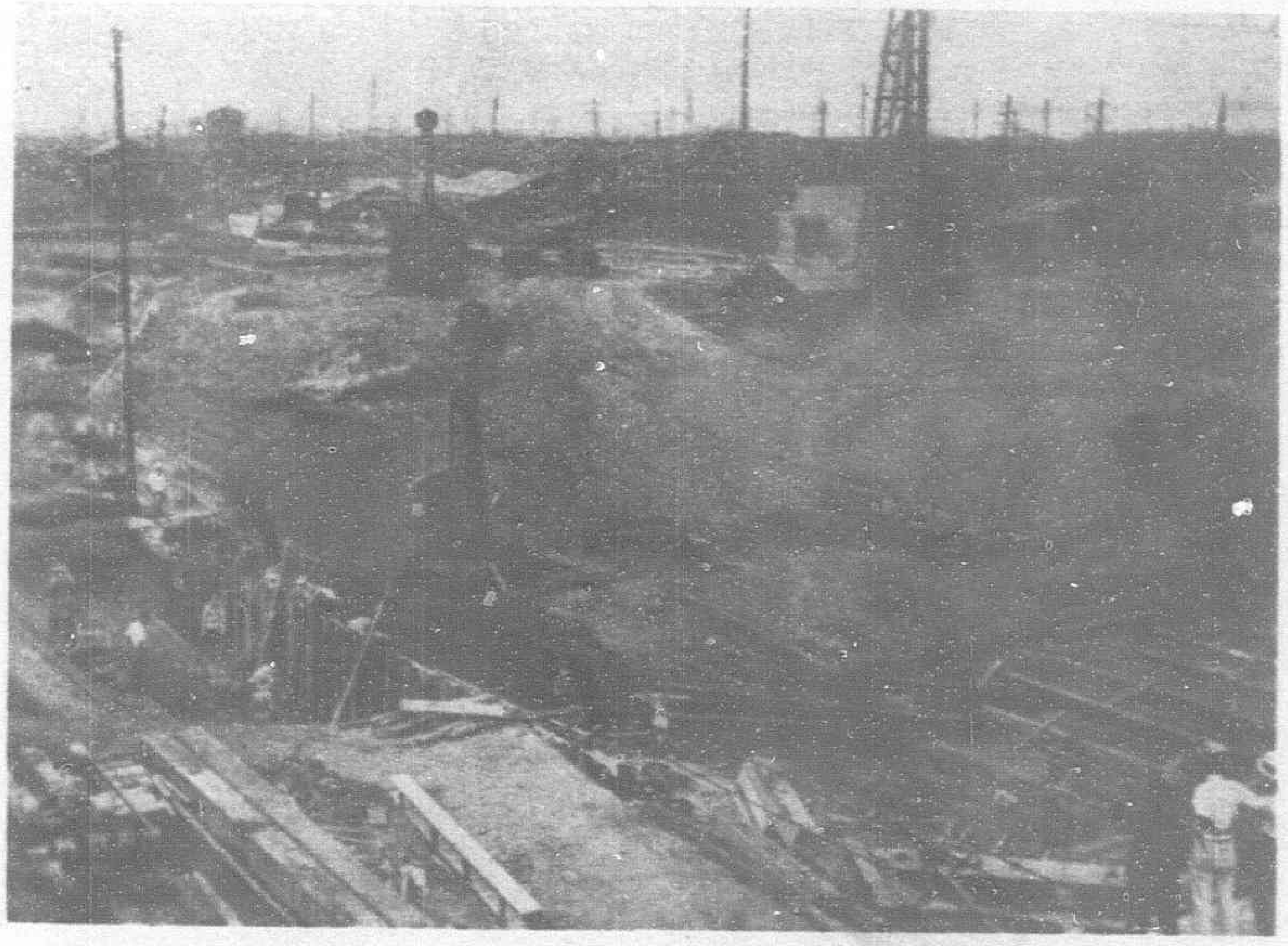
Salient features of Line No. 1 is that both ends are to be an elevated system, the line becoming a subway where it passes through the old city limits. At the northern end of the line, it goes underground on the southern side of the Shin-Yodo-gawa (river) where it crosses the point at which an elevated freight line of the Government Railway is to be built. At the southern end, the line again becomes elevated after it crosses the Kansai line of the Government Railway near the Tennoji Station.

Additional Details

The depth of the underground railway of the Line No. 1 is to vary from 30 to 40 feet from the surface of the ground to the

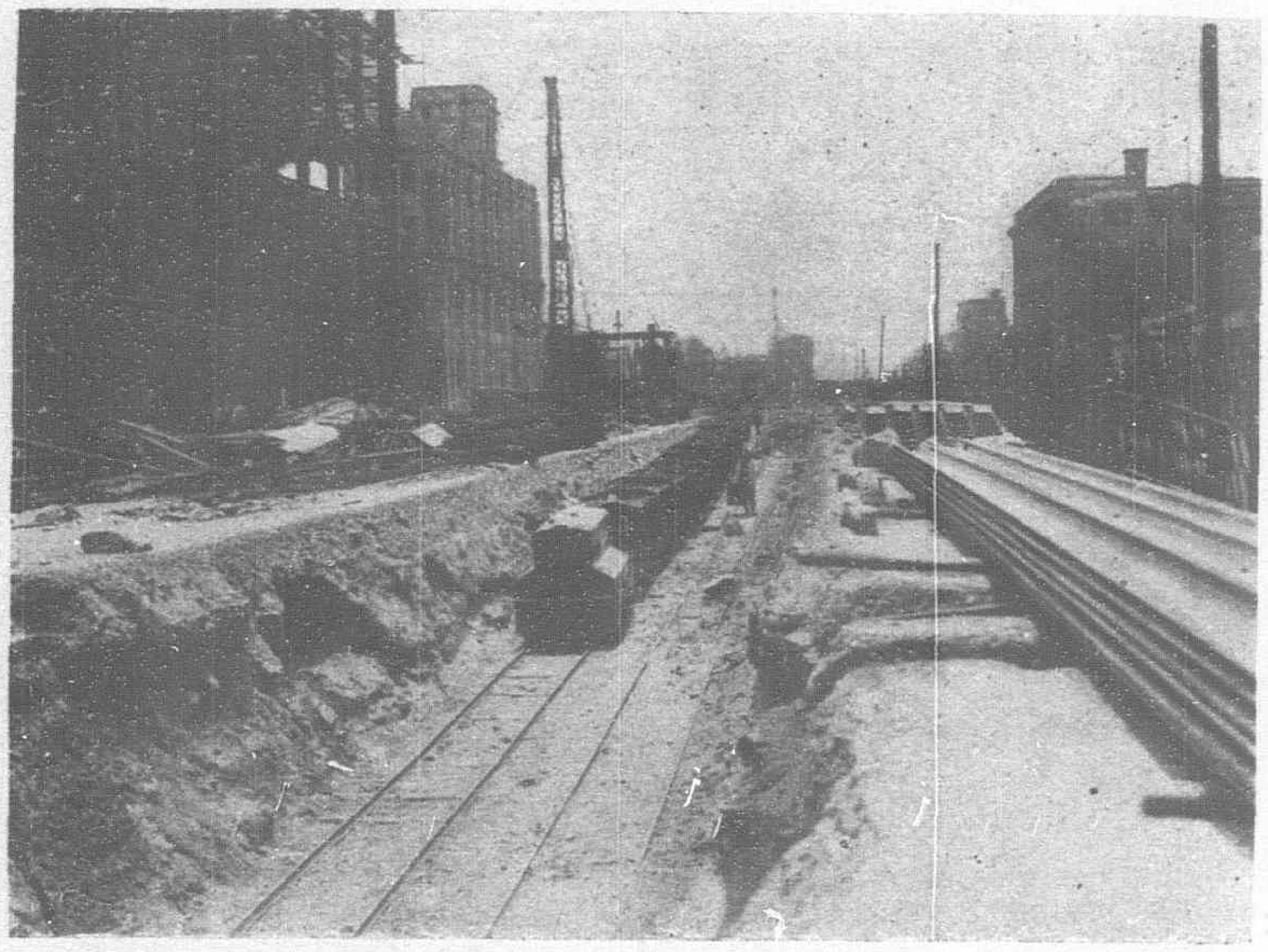


Digging on the northern side of the Osaka Station at Umeda. Note the platform. The high roof on the right is that of the main building of the station which is also going to be rebuilt at an estimated cost of Y100,000,000. The subway is to go underneath the new station. July 17, 1930)



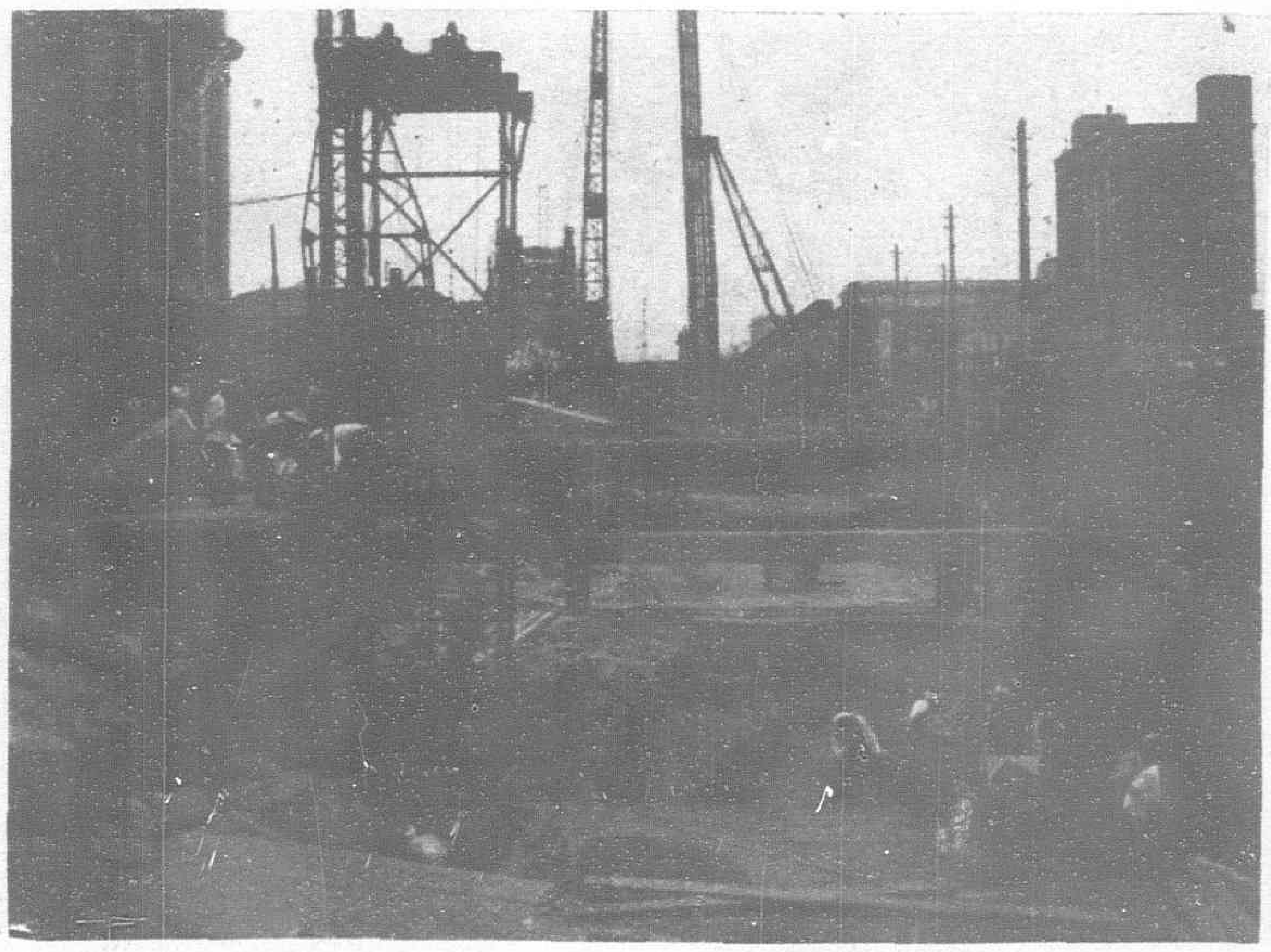
Excavation work in full swing in the neighborhood of the Osaka Station at Umeda, showing a dragline in operation. (July 17, 1930)

4



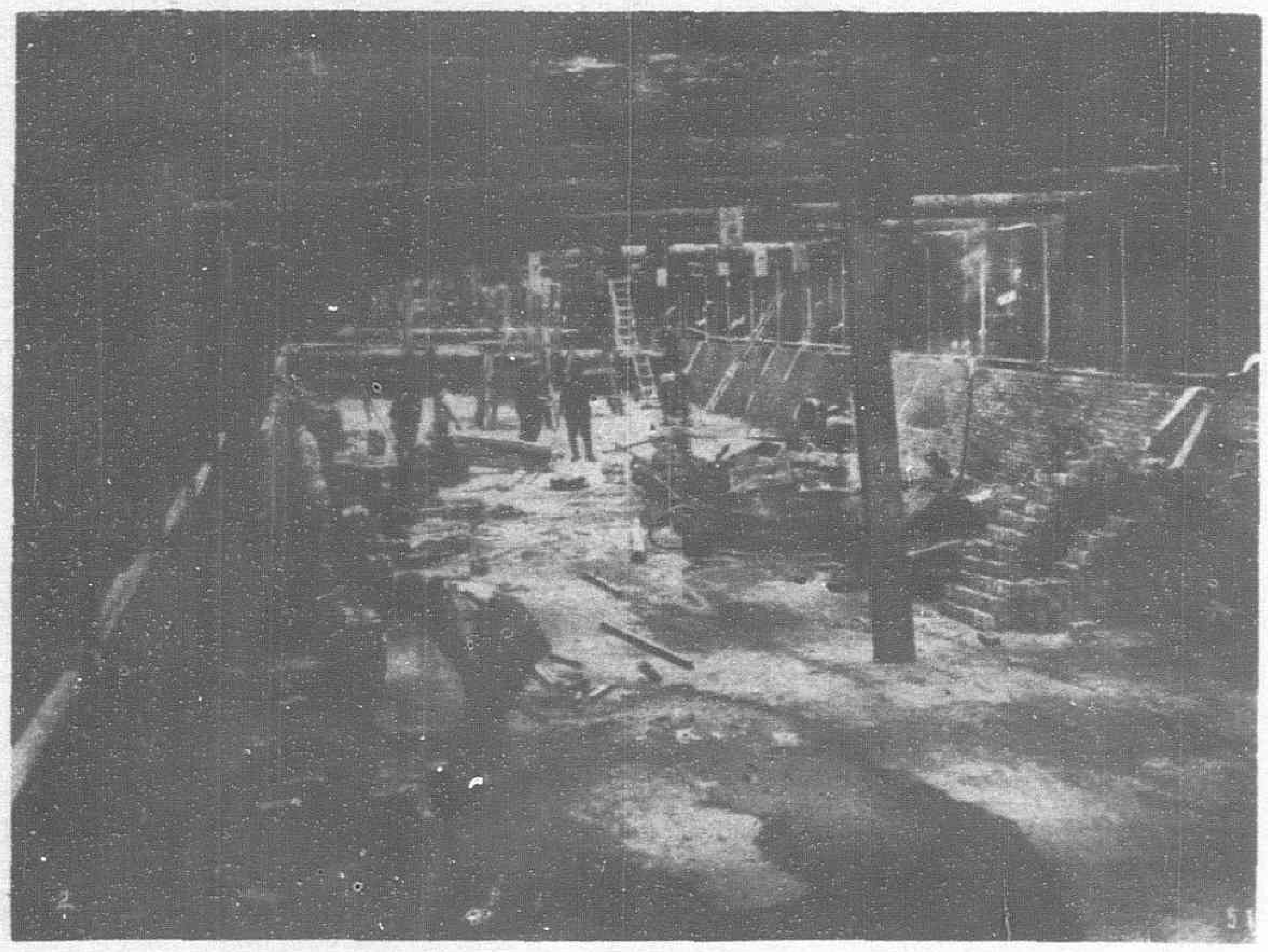
1

A Gasoline locomotive hauling away earth. The building under construction on the left is that of the Japan Life Insurance Co. (July 17, 1930)



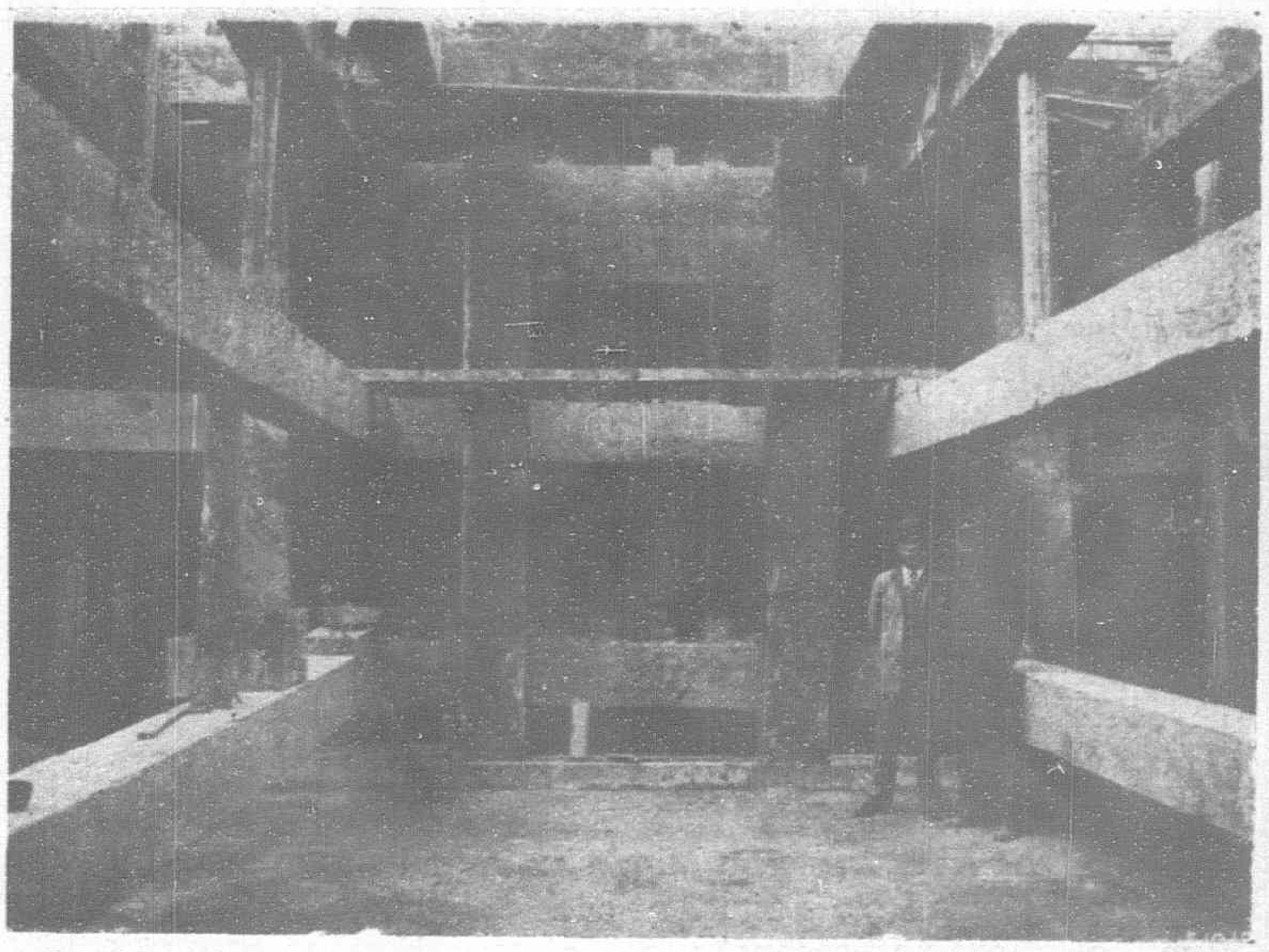
2

Excavating in front of the Osaka Municipal Office. Note the two elevators that alternatively carry up a loaded cart and lower an empty cart. (August 13, 1930)



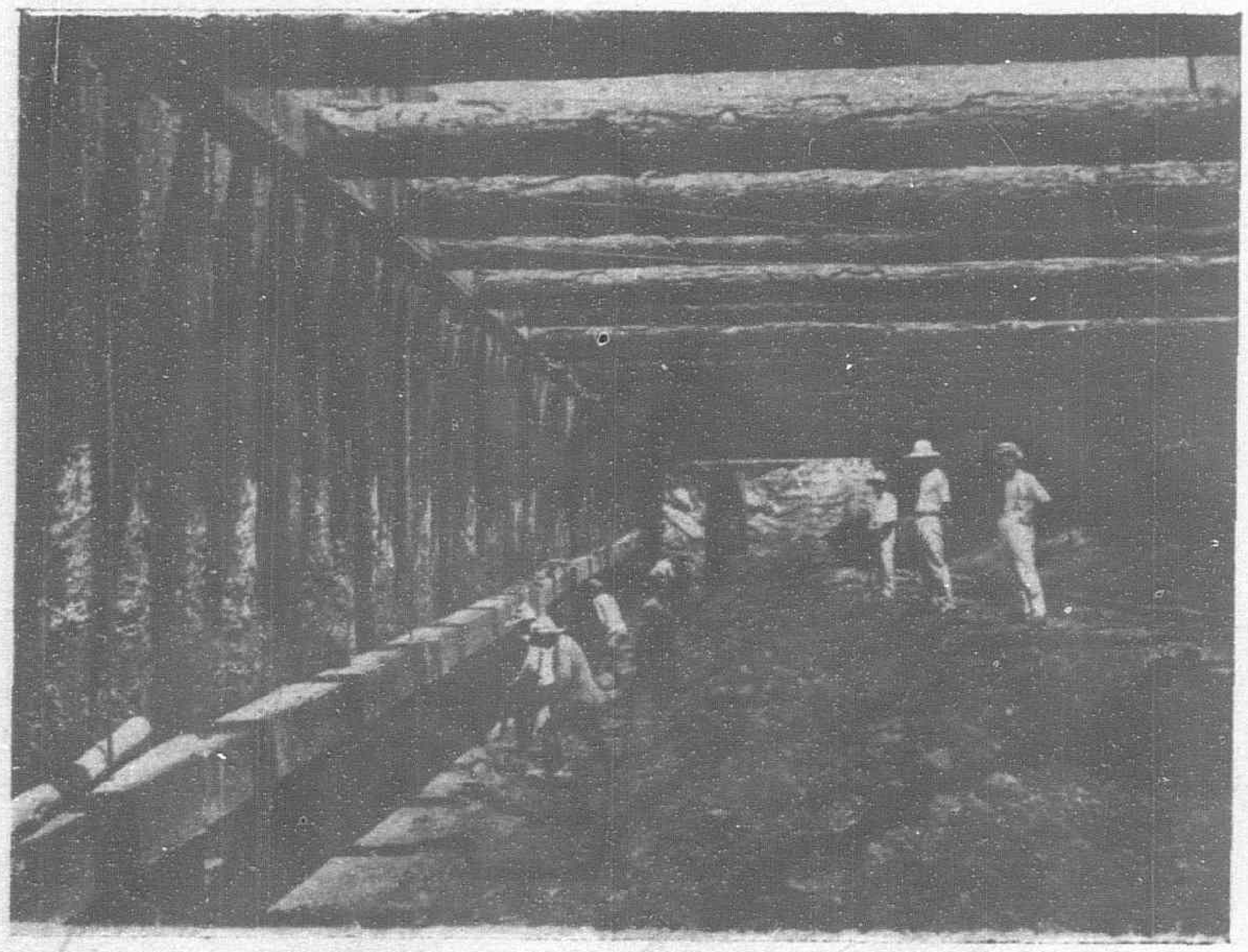
3

Putting up a brick wall to prevent inflow of water in the neighborhood of Bingo-machi. Note the cemented part of the walls on the right. (October 24, 1930)



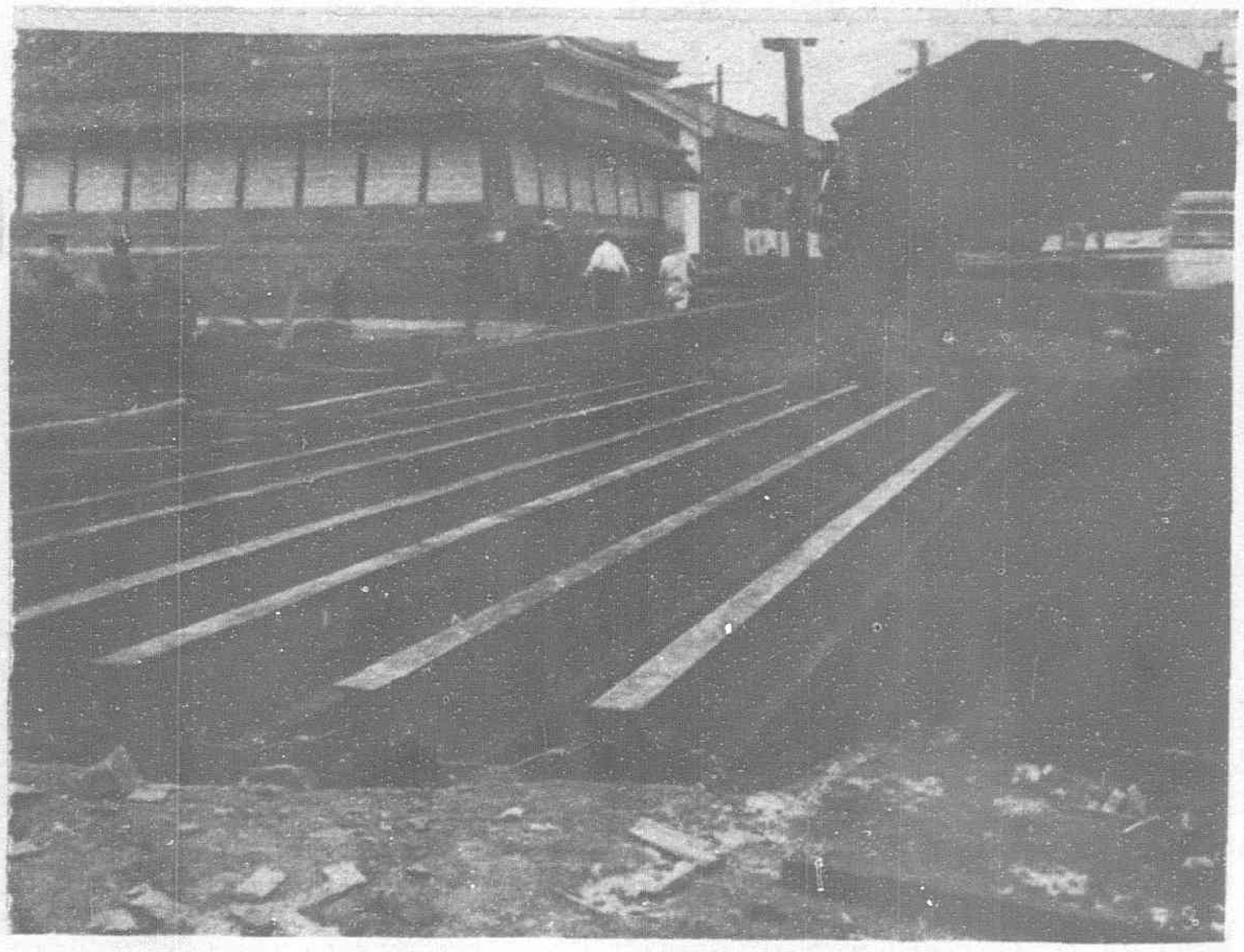
4

Section of the framework that props the sheet-panelling on both sides, showing the side wall and the concreted bottom of the subway, seen in the neighborhood of the Osaka station, Umeda. (October 16, 1930)



5

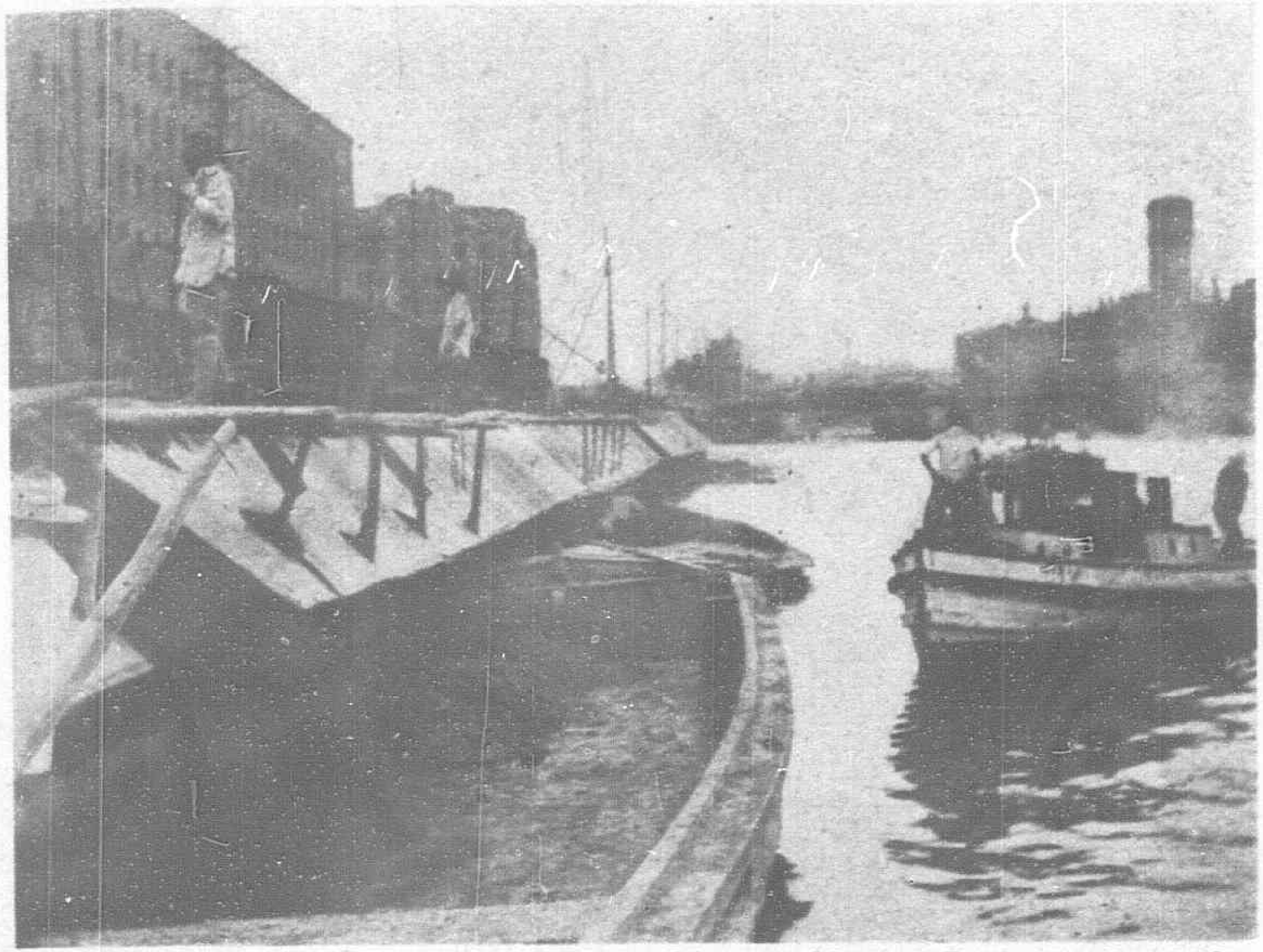
Excavating between Kawara-Machi and Bingo-Machi



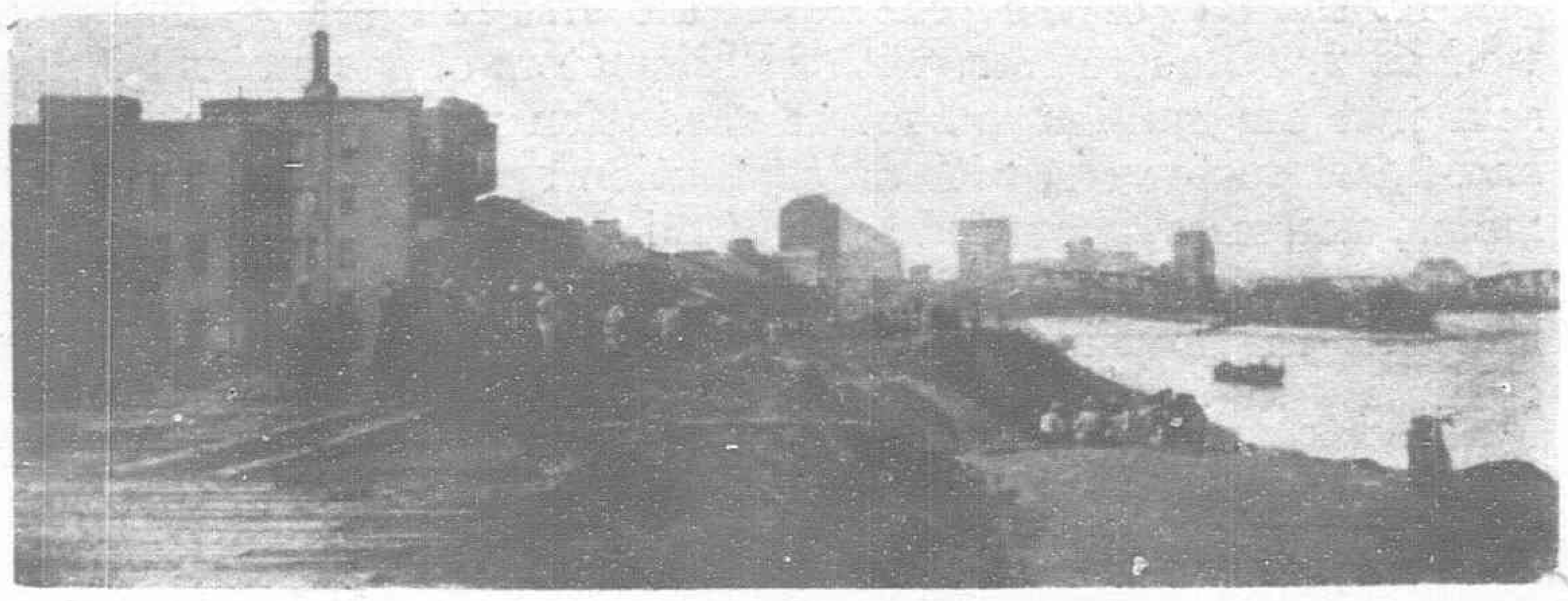
6

Covering the crossing in the neighborhood of Bingo-Machi. (September 25, 1930) rails. The shallow subway (beneath streets) will have an effective width of 28 feet, and height, 16 feet; the deep subway (underneath rivers), effective width, 27.5 feet, and height, 16 feet. The elevated system will have a single pier of reinforced concrete, the height between the ground and the rail being 22.4 feet; the width of the elevated railway will be 33 feet.

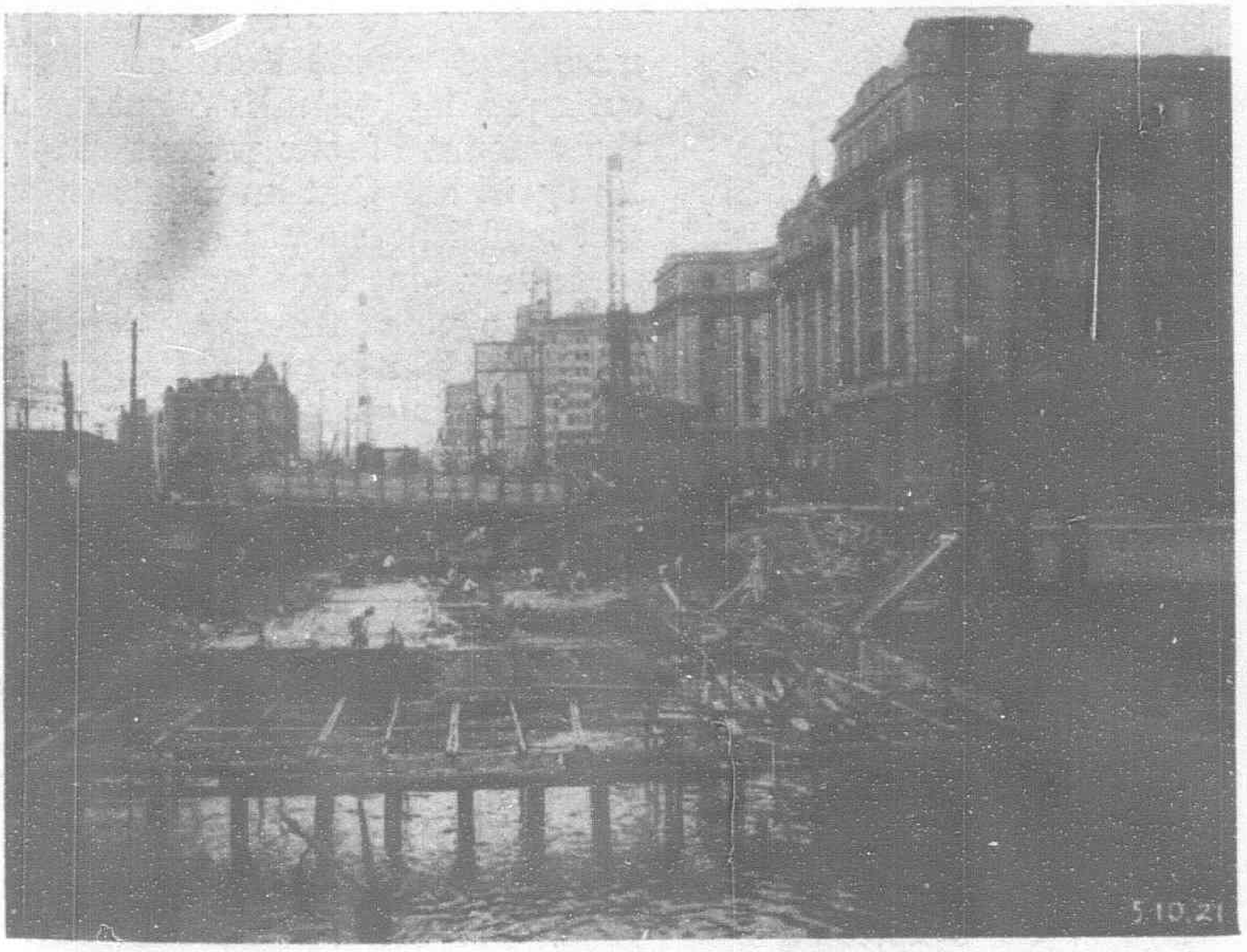
The entire system will be equipped with 100 lbs. rails and three positions automatic block signalling with overlap section device. The trains will be operated by 600 volt direct current power, transmitted from the City Electric Bureau's switchboard, by means of the third rail system instead of trolley.



Disposal of earth excavated is a big problem. It is now used in reclamation work. In the picture is seen a barge being filled with the earth on the southern embankment of the Tosabori-gawa. (July 19, 1930)



Part of the Neya-gawa is being reclaimed with the earth excavated by the subway construction. (September 11, 1930)



Part of the Tosahori-gawa being reclaimed with excavated earth. The building on the right is the Osaka Municipal Office. (October 21, 1930)

The Kirin-Tunhua Railway

(*Continued from page 39*).

According to another variation it is proposed to run the Tunhua Railway from Laotowkow *via* Tungfassu-Yanchi to the Korean city of Onsyon, where it will be connected with the Korean frontier line, the construction of which will be undertaken during the next few years. It will then have an outlet to the sea at the port of Yuki (also called Ungai), which is the northern-most port of Korea located near the boundary with the U. S. S. R. and China, 20 kilometers from the frontier river of Tumen-ula and 56 kilometers from the Chinese city of Hunchum, or at the port of Rasshio (42° 4-m. N. Lat., 130° 3-m. E. Long.), 75 kilometers to the north of Seishin. There also is a variation of a shorter and more direct route from the Korean border to the port of Rasshin.

For the time being it has not been decided as yet which of the above mentioned plans will be put into effect.

It suffices to throw a cursory glance at the map of Manchuria and Korea to realize the tremendous importance which the new trunk system will have, should the above described projects be put into effect, for the general system of railways in Manchuria, particularly taking into consideration the proposed branch lines (Kirin-Wuchang-Harbin, Yanchi-Ninguta-Hailin-Sansing, Changchun-Taonan-Solun-Hailar, and others).

This system will cover all the most important commercial, industrial and political districts and centers of the country, and will at the same time offer the shortest outlet to the sea, compared to all other actually existing railways in Manchuria, for a number of localities of large economic importance. In order to illustrate the above we shall give information regarding the distances from two of the most important centers in Central and North Manchuria—Harbin and Kirin to the Korean ports of Seishin and Rasshin, with which the system will be connected, on the one hand, and on the other, to the ports, with which other railways in Manchuria are connected, for whom the new system will be a competitor.

The distances are given in the following table:

I. FROM KIRIN:	
1. By the Kirin-Tumenkiang Railway:	
(*a*) to Seishin	572 km.
(*b*) to Rasshin	490—540 ,,
2. By Chinese railways (Kirin-Hailung-Mukden):	
(*a*) to Hulutao	766 km.
(*b*) to Yingkow	732 ,,
(*c*) ditto *via* Tashihchiao	649 ,,
II. FROM HARBIN.	
1. To Vladivostok by Chinese Eastern Railway and Ussuri Railway	749 km.
2. To Dairen by Chinese Eastern Railway and South Manchuria Railway	942 ,,
3. To Yingkow *via* Wuchang-Kirin-Mukden and Peking-Mukden Railway	982 ,,
4. Ditto to Hulutao	1,016 ,,
5. To Seishin *via* Wuchang-Kirin-Hoiren	822 ,,
6. Ditto to Rasshin	740—420 ,,

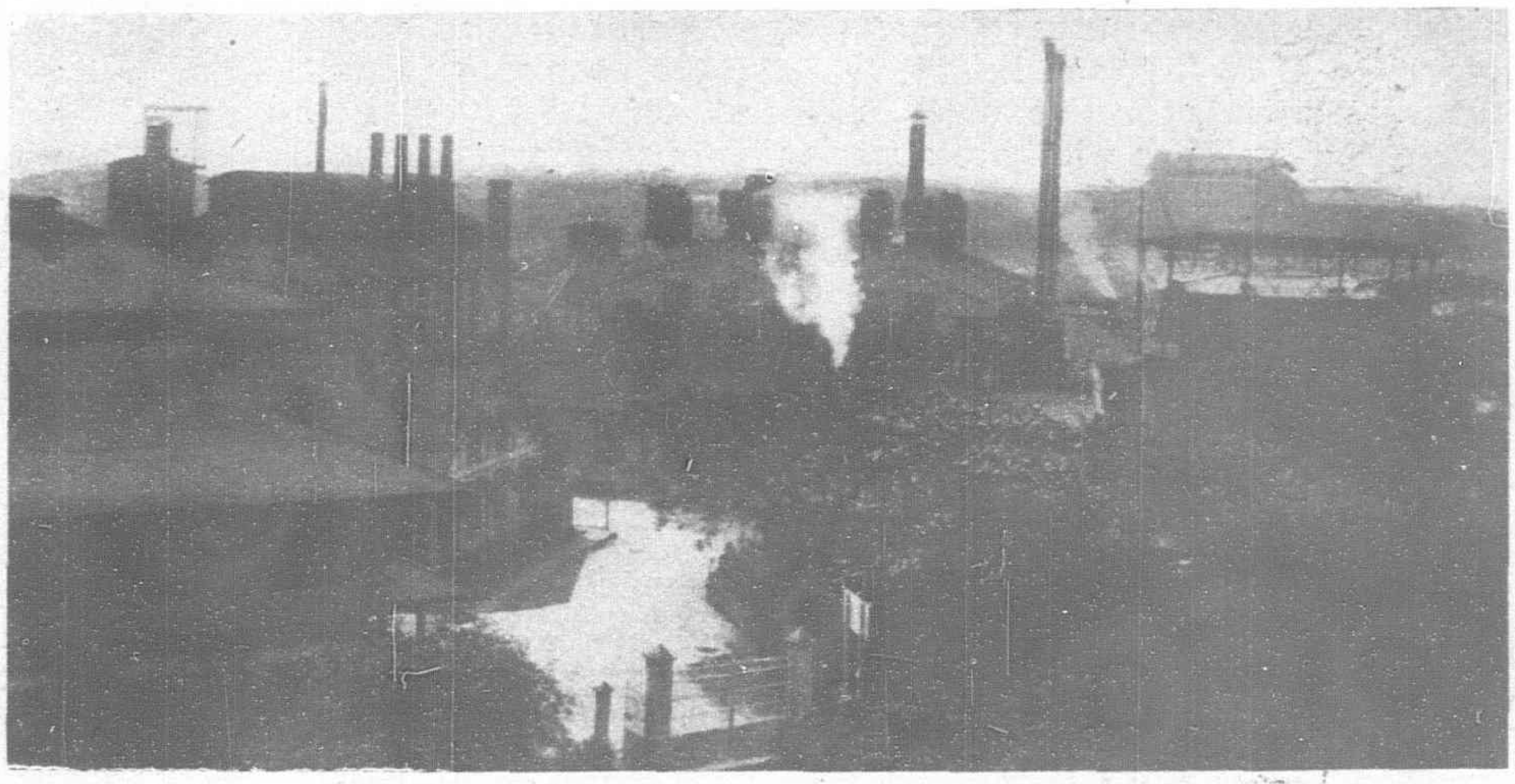
The above table shows that upon the connection of the Kirin-Tunhua Railway with the Korea railways, particularly, upon the adoption of the shortest outlet to Rasshin, the Korean trunk system will have such large advantages over other lines that it will be most difficult for them to compete with it for the transportation of goods.

The projected Korean trunk railway will also be a very strong competitor for the Dairen route of goods conveyed by the South Manchuria Railway. The latter will lose the goods of Harbin, Kirin, and may be also of other points (depending upon the adoption of one or the other variation of branch lines from the Kirin-Korean trunk system).

The proposed Kirin-Korean trunk railway system is of tremendous economic importance for Japan, because it opens a way into a number of regions abounding in raw products, which Japan requires for its industry (timber, iron and other ores and various kinds of useful minerals).

WHAT GAS IS DOING FOR MANILA

By A. HOYER, Vice President,
Manila Gas Corporation



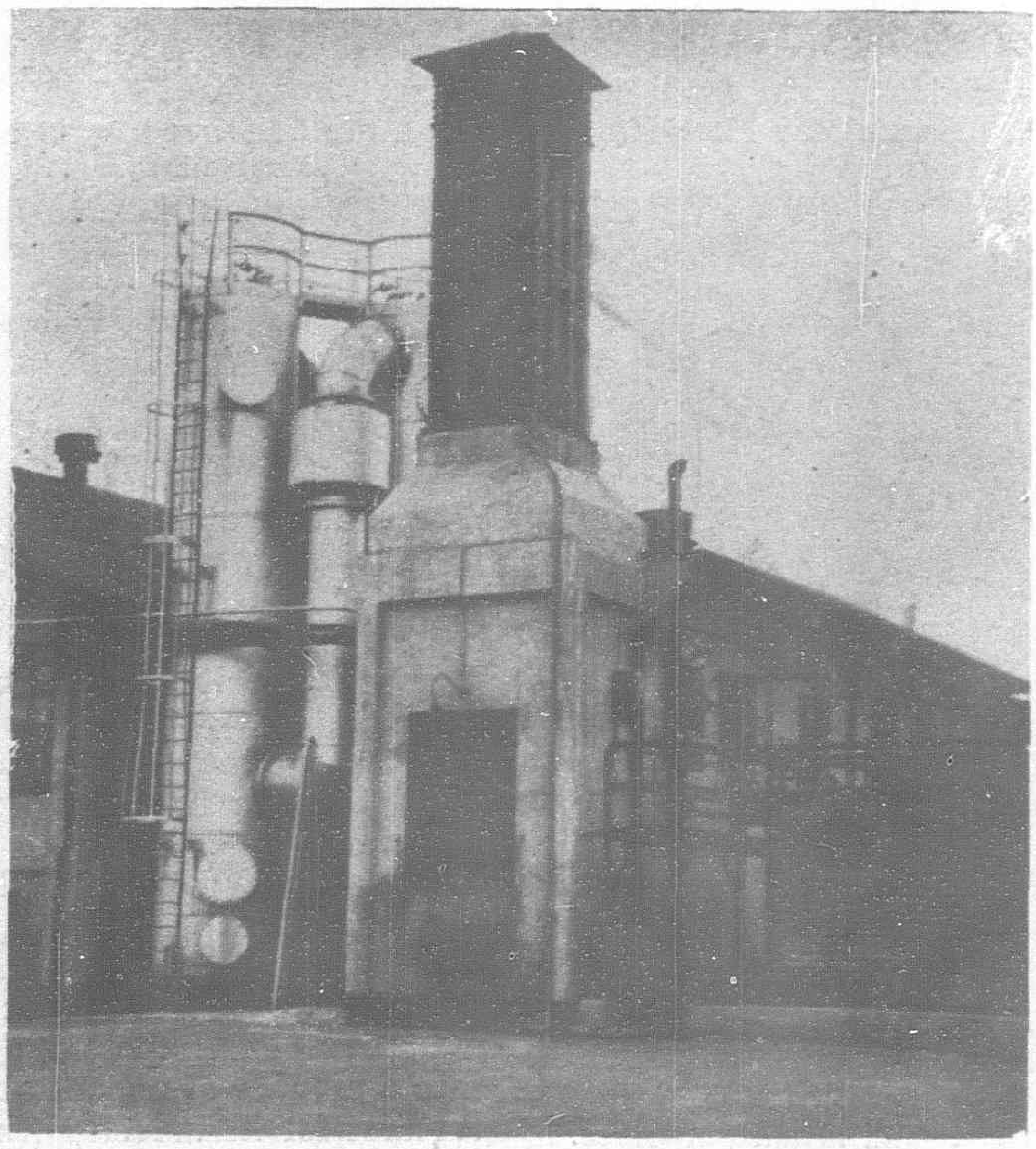
Manila Gas Corporation: Office Building in Front

The existence of the Manila Gas Corporation dates back to October, 1913, when it was incorporated under the laws of the Philippine Islands, and soon thereafter acquired the gas franchise granted on January 2, 1912, by Governor-General W. Cameron Forbes to the Swiss Gas Company.

The franchise granted the right to construct, maintain and operate a modern plant for the manufacture and sale of gas for heat, light and power in the City of Manila and in the Province of Rizal.

The conditions of the franchise were strict but the grantee fulfilled every part of same. For instance: The construction of the plant was to be commenced within nine months from the date of the granting of the permission to construct by the Municipal authorities. Construction work started in June, 1912, or within less than six months after obtaining the franchise. Another clause demanded that we should begin operation of the plant with 75 kilometers of gas mains laid within eighteen months after the expiration of the above-mentioned period of nine months, which would have been about April 1914. Despite adverse climatic conditions and many unforeseen difficulties the contractor did an excellent job by enabling us to send out gas for the first time on November 13, 1913, thus beating the time schedule by five months.

I was the youngest member of the expedition which was sent out from Europe by the construction firm, and the first three of us landed in Manila on April 24, 1912. We were called together in haste from different places in Europe where our firm had undertaken the erection of gas and water works. When we landed in Manila we had in our possession but a few documents outside of a specific plan of the proposed gas plant and a copy of the gas franchise. All other essential details were left to be solved by us. You should have seen our faces when our legal representative, the late Mr. Kincaid, showed us the site out in Paco, purchased for the erection of the gas plant. It consisted at that time, in 1912, as many of you old-timers will remember, of a great big swamp and marshy land. There was no time for arguments, however, as the franchise called for a very short construction period. Engineers were set at work and, with the able assistance of the A. G. & P. Co., the expensive pile foundations for the Gasholder, Ovenhouse and Apparatushouse were undertaken. The peculiar character of the soil and the possibility of damage by typhoon and earthquake required the driving of 1,100 wooden piles, 36 feet long, at a distance of about three feet apart from each other, for the foundation of our gasholder of 7,000 cu. m. or 250,000 cu. ft. The whole gasholder, including one million gallons of water, weighs 4,200 tons.



Manila Gas Corporation: Dehydration Plant

The laying of our gas mains caused us much trouble, due to the heavy rains and floods during the rainy season.

The word "gas," as was understood ordinarily at that time, did not coincide with the local language. Gas was the word for petroleum. On many occasions the Spanish name of our corporation (Fabrica de Gas) was mistaken for the Standard Oil Co. of New York at Pandacan.

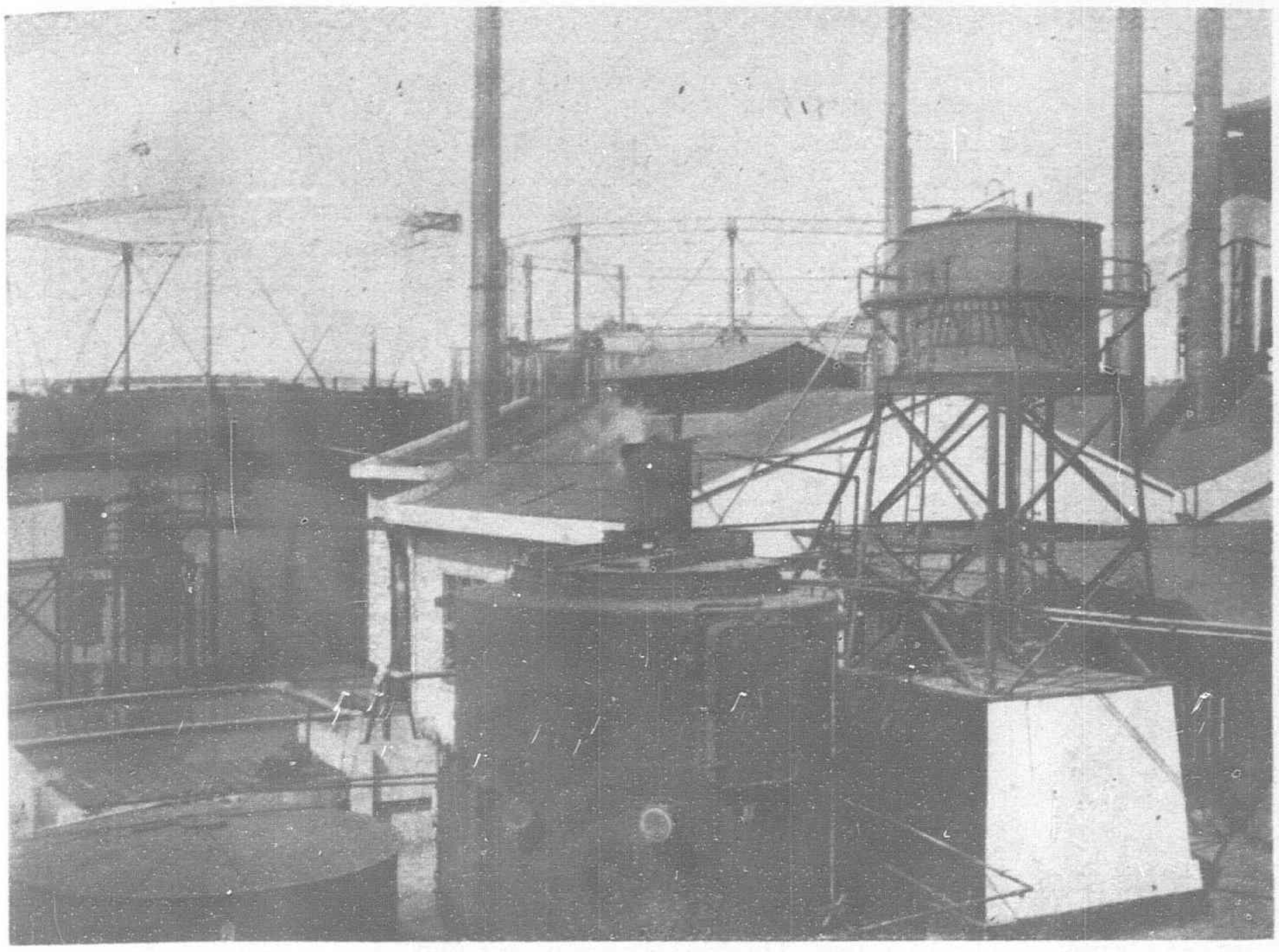
Slowly but surely did we obtain a foothold in the local community, and gas as an ideal and economical fuel for use in the household and factory was soon recognized and proven by the steady growth of the number of gas customers, and the quantity of gas sold.

At the end of the year 1914 (the first full year of operation) we had 2,600 customers, with 80 kilometers of gas mains laid, and sold just one million cu. m. of gas. Ten years later in 1924 we had 9,900 customers, with a distribution system of 114 km. of gas mains, and sales amounted to eight million cu. m. gas. At the close of the year 1929, 17,400 customers were on our books, with 216 km. gas mains laid, and close to 12 million cu. m. gas were sold.

Our plant was originally planned for a maximum daily production of 10,000 cu. m. gas. To-day, through several additions and improvements, our plant capacity amounts to seven times the initial capacity, assuring a maximum production of 70,000 cu.m per day which is about double the amount of our present output. You will see that an uninterrupted and sufficient supply of gas to our customers is thereby guaranteed for some years to come.

The Manila Gas Corporation made, during the first four years of its existence, coal gas only, but already in 1917 our capacity had been reached and the increased demand for gas by the Manila populace made it necessary to adopt the carburetted water gas process to meet the situation. The first two sets of this machinery were bought in 1917 in the United States and just in the knack of time. A third set was added in 1923, and the last and fourth set last year.

During the latter part of the war the supply of Gas Oil became



Manila Gas Corporation: View Showing Relief Holders, Tar Distilling Plant, Boiler House, etc.

scarce, and we were often on the brink of shutting down our plant. Fortunately the Philippine Government requisitioned sufficient quantities of crude oil which enabled us to carry on.

For a while we used Philippine coal mined by the National Coal Co. in small quantities as a substitute for Coke in our Water Gas Plant.

Our supply of gas coal, amounting to about 12,000 tons annually, must be brought here from distant countries, amongst which Australia and Japan rank first. Occasionally conditions like strikes of the miners etc. force us to buy coal in China, India, Borneo, French Indo-China and England.

To offset any possible danger in case of a disturbance in anyone of these foreign coal markets we are compelled to carry a considerable stock of gas coal in our yards. Last year we had an average of a 68 days' supply of coal on hand, but at the present time we have increased our stock to an amount equal to 115 days' supply. To demonstrate the isolated situation in which we find ourselves in Manila, I will give you some figures prevailing in the United States regarding the number of days supply of coal: The Coal Gas Plants carried in January of this year 57 days supply ; the Railroads 22 days ; and the Steel Mills 27 days supply.

You are all familiar with the common facts about the process of making gas, so I don't need to take up your time on this subject. However I wish to add a few words regarding our methods and improvements made by us. As you know, Gas is rightly called the soul of coal, and coal constitutes, therefore, the prime raw material for many gas works.

However, this was partly changed when crude oil went into the field of assisting the gas industry in making gas on a larger scale through the adoption of the Lowe process. This kind of gas is called Carburetted Water Gas and requires as fuel coke or anthracite, an air blast with steam intermediately forced through the fuel and principally Gas oil. The oil is sprayed into the carburettor.

This same process has been adopted by us, as I stated previously, during the year 1917.

Gas is not the only product which we sell. We obtain as residuals Coke and Tar, for both of which we found, after several years of endeavor and propaganda on our part, a market. Last year we sold about 660 tons Coal Tar and Coal Tar Paint, 870 tons of Water Gas Tar, a good substitute for creosote, and 1,500 tons Coke, mostly to wholesale dealers throughout the Islands.

We have on our payroll over 450 Filipino employees and laborers, who are contented with their jobs as they find steady employment with us. In consequence thereof our labor turnover is very low.

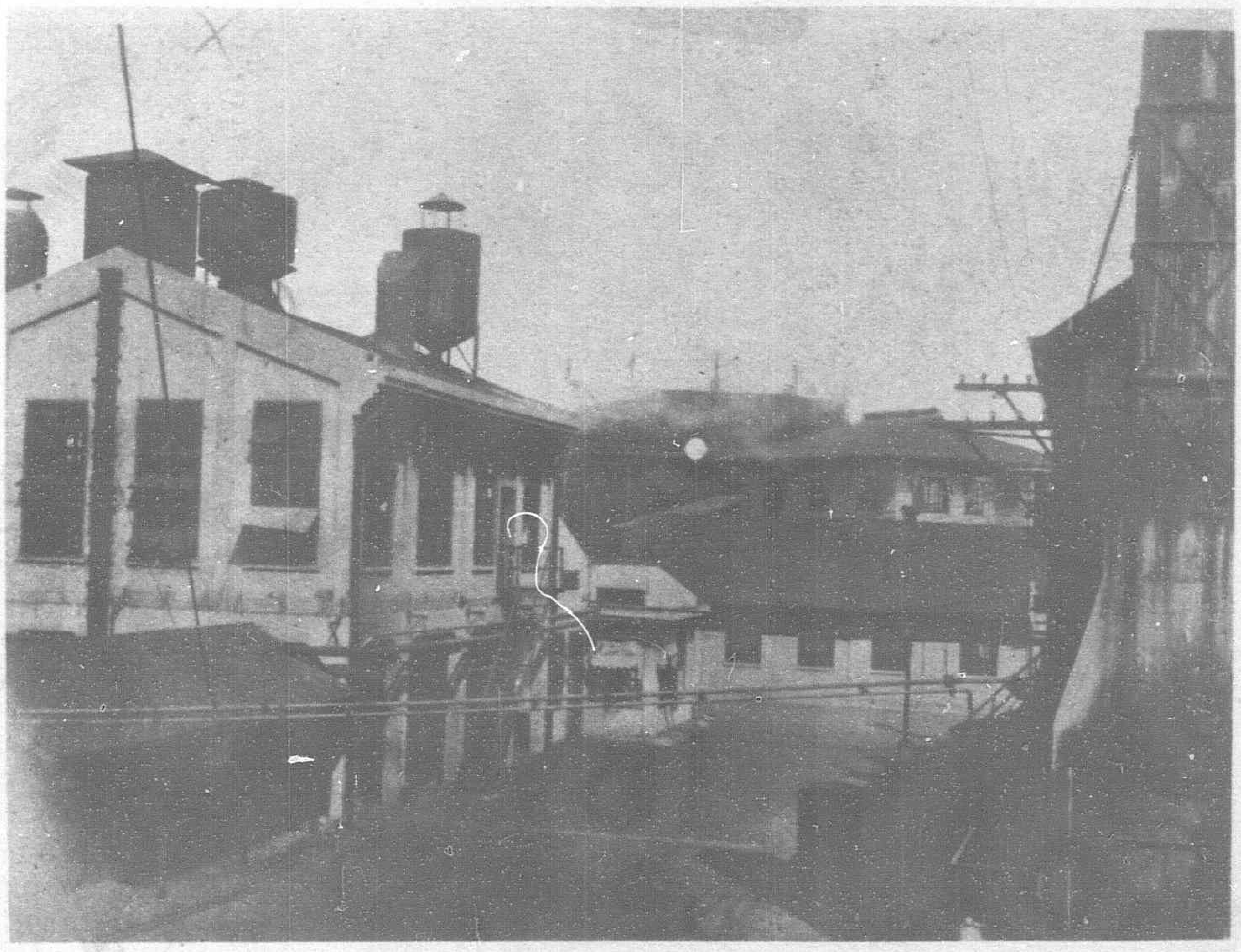
One-fifth of these men has been in service with our corporation for from eight to 17 years. Amongst them is one laborer who has been with us 17 years, (*i.e.* ever since we started) fourteen laborers and employees have 16 years and seven men 15 years to their credit.

Last year we paid $292,000 to our Filipino employees and laborers as salaries and wages, and are proud to state that cordial relations have always existed between them and the management. The nature of our business, operating a public utility, requires a very close and harmonious co-operation between the staff and its employees and laborers.

Our relief measures adopted for the benefit of our laborers were appreciated by them. A First Aid Station at the Plant administered 822 treatments to 284 laborers during the year 1929. Of all medical and hospital expenses, as well as of salaries and wages paid to sick men, 20 per cent of the total sum was obligatory under the Labor Compensation Law, and the remaining 80 per cent was paid by us voluntarily.

New and modern plant facilities were added during the last twelve months, of which I wish to mention an automatically operated Water Gas Set and a gas dehydration plant. Gas dehydration is a new innovation of the gas industry. Its purpose is to reduce the content of water vapor in the gas, thereby eliminating inside corrosion of main pipes and gas meters. Another advantage dervied from dehydrated gas is the assuring of an uninterrupted gas supply to our customers. Only a few gas plants in the States and England have made use of this new invention. Manila is the sole gas company throughout the East which has installed a Gas Dehydration Plant. While much pioneering work will yet have to be done with the dehydration process, we can safely state

(Continued on page 68).



Manila Gas Corporation: Water Gas Plant: Office Building, etc.

Mukden Automatic Telephone Exchange

British Firm Installs Up-to-date Telephone System in Ancient Walled Manchurian City

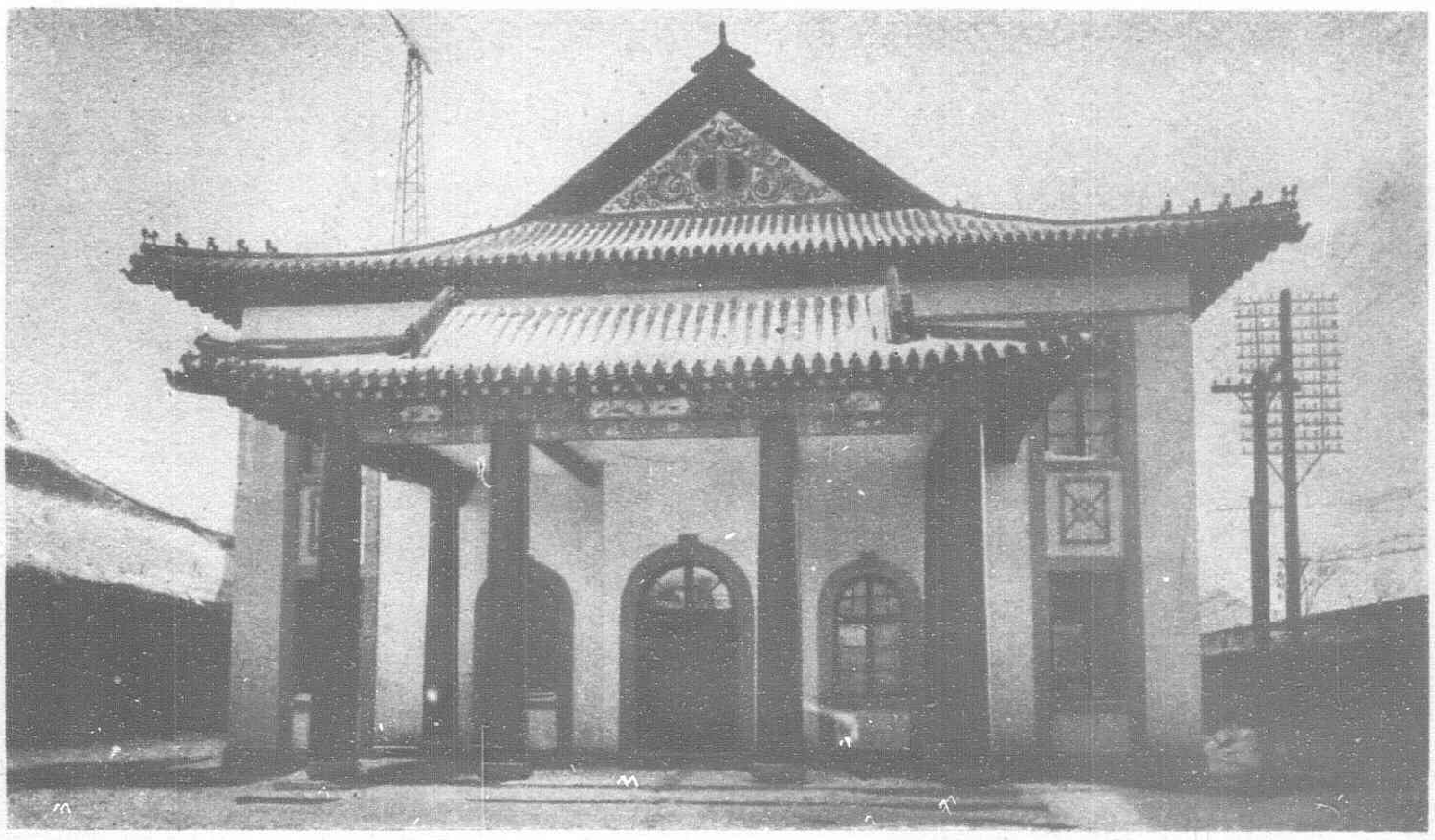


Fig. 1.—Mukden Telephone Exchange Building

Mukden, with a population of about one quarter of a million, is the Capital City of Manchuria and one of the most important towns in China. Situated midway on the South Manchurian Railway and terminus of the Peking-Mukden Railway, it is the great distributing center for Central Manchuria and has developed very rapidly in recent years.

The old walled city, an area of about one square mile enclosed by a massive brick wall, is still the official center, and the Governor General's Headquarters as well as most other Government buildings, are located therein.

It is also within this ancient wall, very many centuries old, that the new automatic telephone exchange, most intricate and marvellous of all recent inventions, is installed, bringing to this old city the most modern facilities for instant and accurate telephonic communication.

The new exchange, which is housed in a specially constructed building, (Fig. 1) designed on picturesque and colorful Chinese lines, was most successfully brought into public operation soon after midnight on November 25, when the old central battery manual system, together with two small magneto-type branch exchange, was finally cut out of service.

The transfer from the old manual system was effected within 15 minutes and was carried out without a hitch and with a minimum of dislocation to the service, under the able supervision of Mr. Clarence Wang, director and chief engineer of the local administration, and Mr. A. Grossett, the manufacturers' engineer, who has been supervising the installation of the equipment on site for some months past.

The inauguration ceremony was attended by a select group of government officials and specially invited guests, while the first call over the automatic system was dialled at about 12.20 a.m. by the Director of Telegraphs and Telephones, General Chiang-Pin, who called up and spoke with the Civil Governor, General Tsang Shih-yi, at his private residence ; mutual congratulations being exchanged on the successful inauguration of the new system. Later, calls were made, *via* the long distance toll board, to Peiping, Tientsin and Harbin, announcing the change over to automatic working to be an accomplished fact.

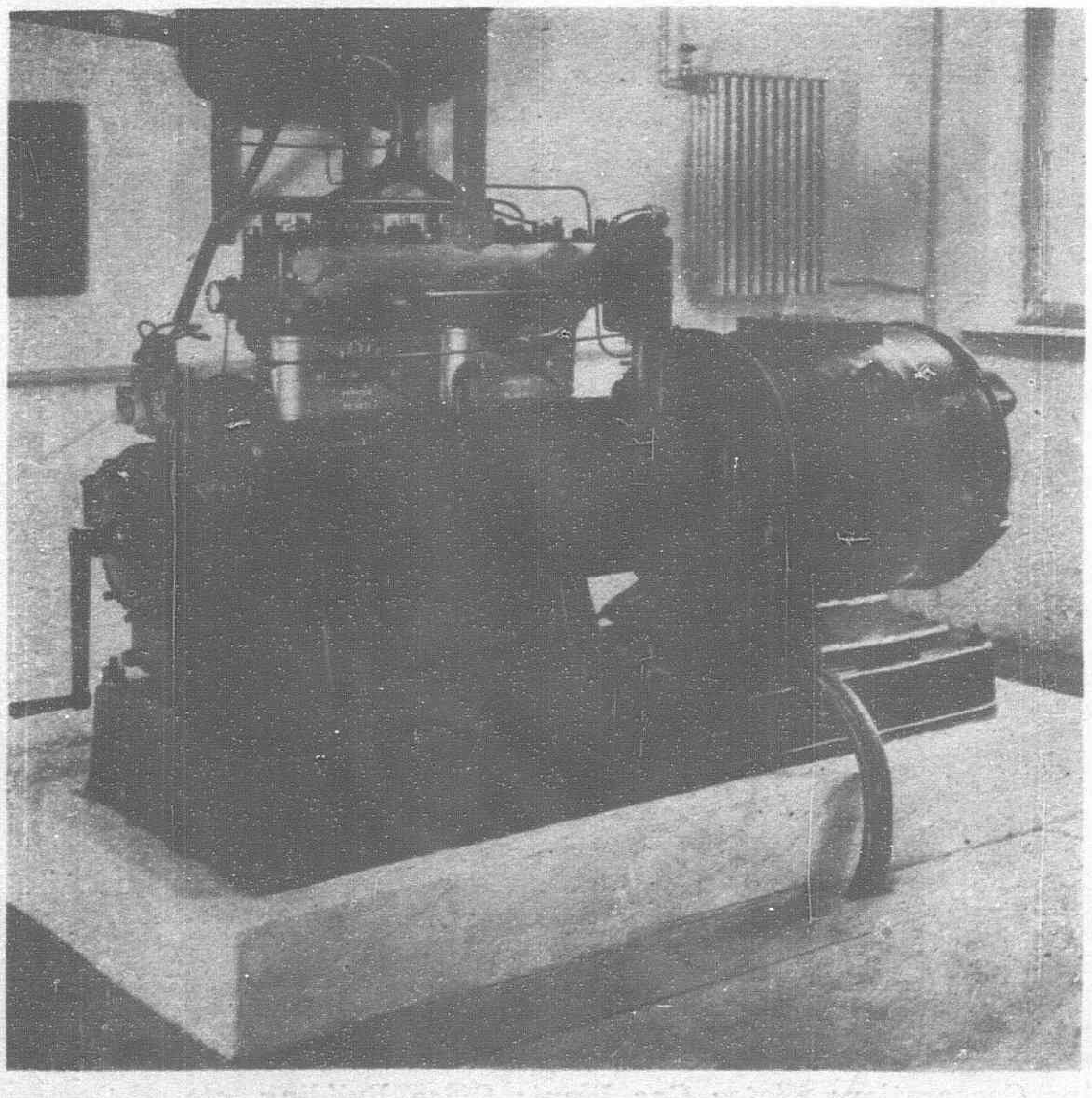


Fig. 8.—Emergency Battery Charging Set

The new system is of the famous "Strowger" type and was manufactured and supplied to the order of the Mukden Government by Messrs. Siemens Brothers & Co., Ltd., of Woolwich, England. It is initially equipped to serve 3,500 subscribers' lines but, after barely one month in operation, the efficiency of the automatic system has brought in so many new applications for telephones that the local authorities are already planning to purchase additional apparatus in order to equip the system to deal with a further 1,500 subscribers.

The circuit principles of Siemens Brothers' Automatic System are characterized by a number of outstanding features :—

(*a*) A 60 volt battery is used for all purposes ensuring improved transmission, particularly over long lines.

(*b*) The circuits are designed to work satisfactorily at all normal voltages. No "end-cell" or other arrangements for voltage regulation are required.

(*c*) The selectors have no side switches.

(*d*) The switches are not self driving, but are supplied with interrupted current from an interrupter machine which ensures correct speed and ratio of make to break of the impulses.

(*e*) The test wiper of a searching switch tests the bank contacts for battery, and therefore passes over all disconnected or earthed contacts.

(*f*) The line current for the subscriber's transmitter is fed from the first or incoming selector, thus obviating the necessity for the use of special repeater equipments on junction lines between exchanges.

The operation of the system, as far as the subscriber is concerned, is similar to that of any other automatic system. To make a call, he takes off his receiver, and hears the "dialling tone" signifying that the automatic apparatus is ready to receive the call. Under normal conditions the tone is heard immediately. The telephone dial is then operated in the usual manner and each time the dial returns to its normal position, a number of impulses, corresponding to the digit dialled, are transmitted to the exchange apparatus. The automatic switches at the exchange, responding to these impulses, establish connection with the required line.

To enable a subscriber to obtain connection with the selecting switches, which, on account of cost, are limited in number, his line is provided with a simple rotary switch known as a "Pre-selector." The function of the pre-selector is to search automatically, immediately the telephone receiver is lifted, over ten contacts for a free route to a Second Pre-selector.

The Second Pre-selector is similar to the first Pre-selector, its function being to increase the number of outlets from any one subscriber's line from ten to one hundred since each first Pre-selector has access to ten second pre-selectors and each second pre-selector a choice of ten selecting switches (First Selectors). The time

AUTOMATIC TELEPHONE EXCHANGE IN MUKDEN

Equipped with Siemens Brothers & Co., Ltd. (London) Apparatus

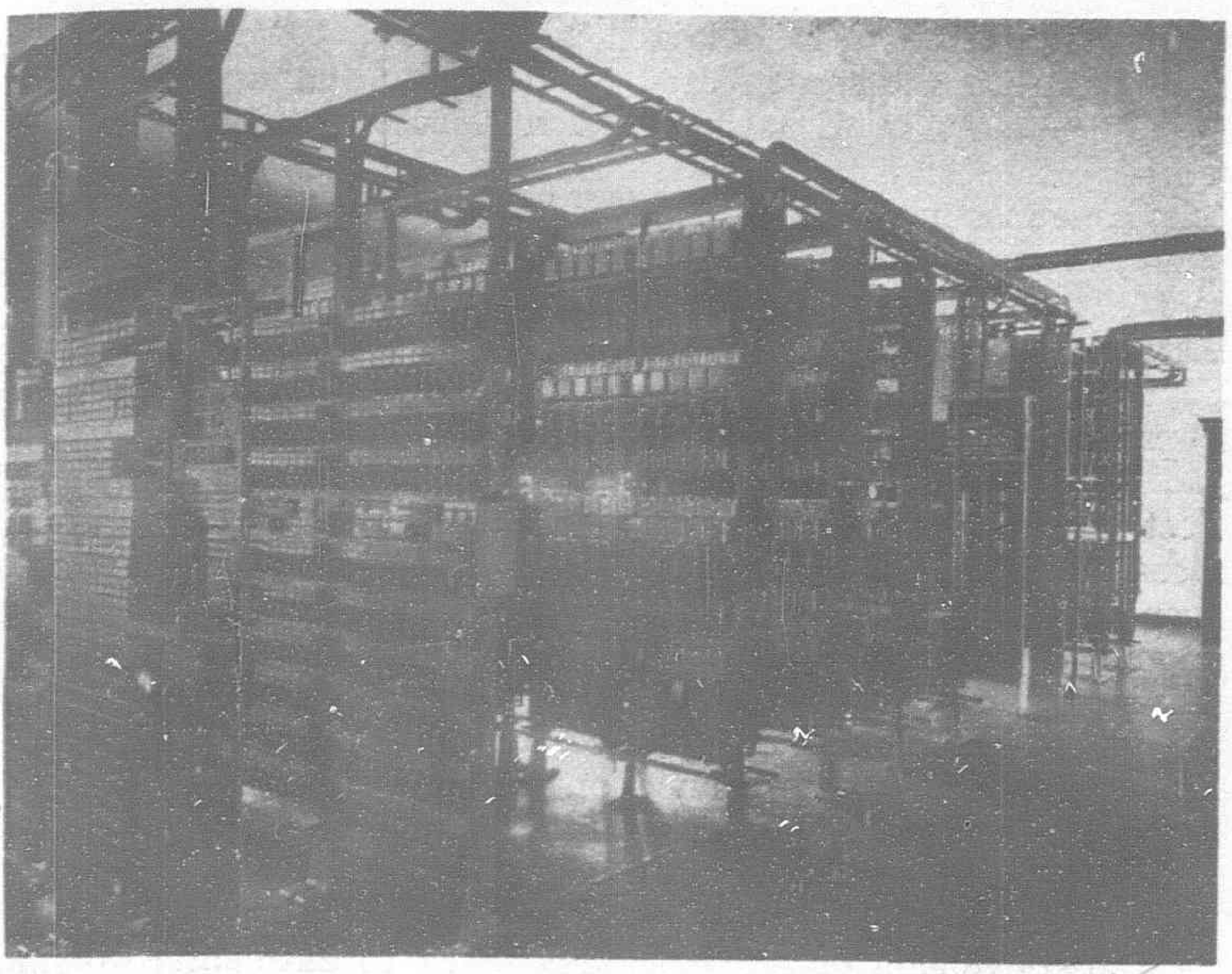


Fig. 2.—Preselector and First Selector Racks

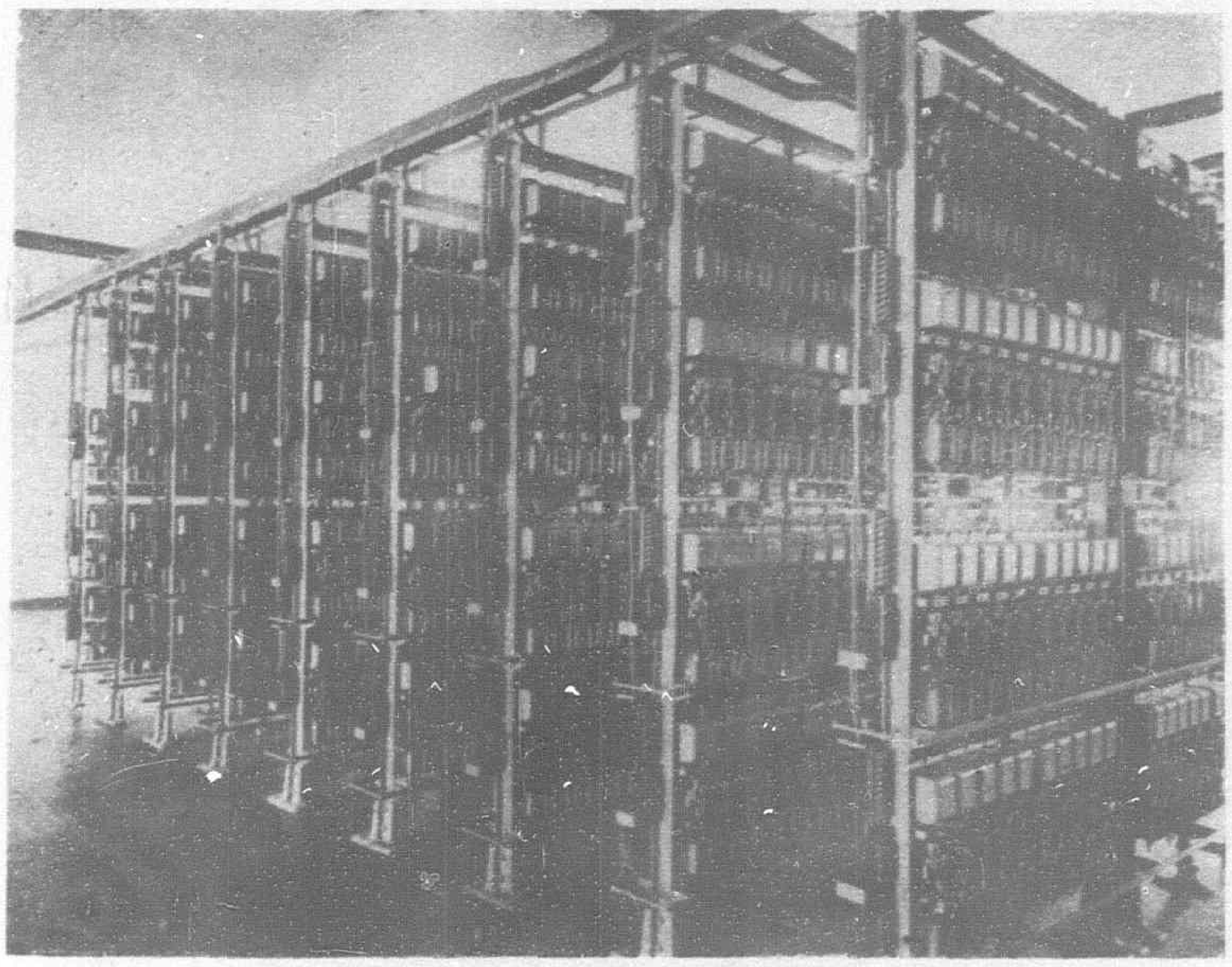


Fig. 3.—Final Selector (or Connector) Racks

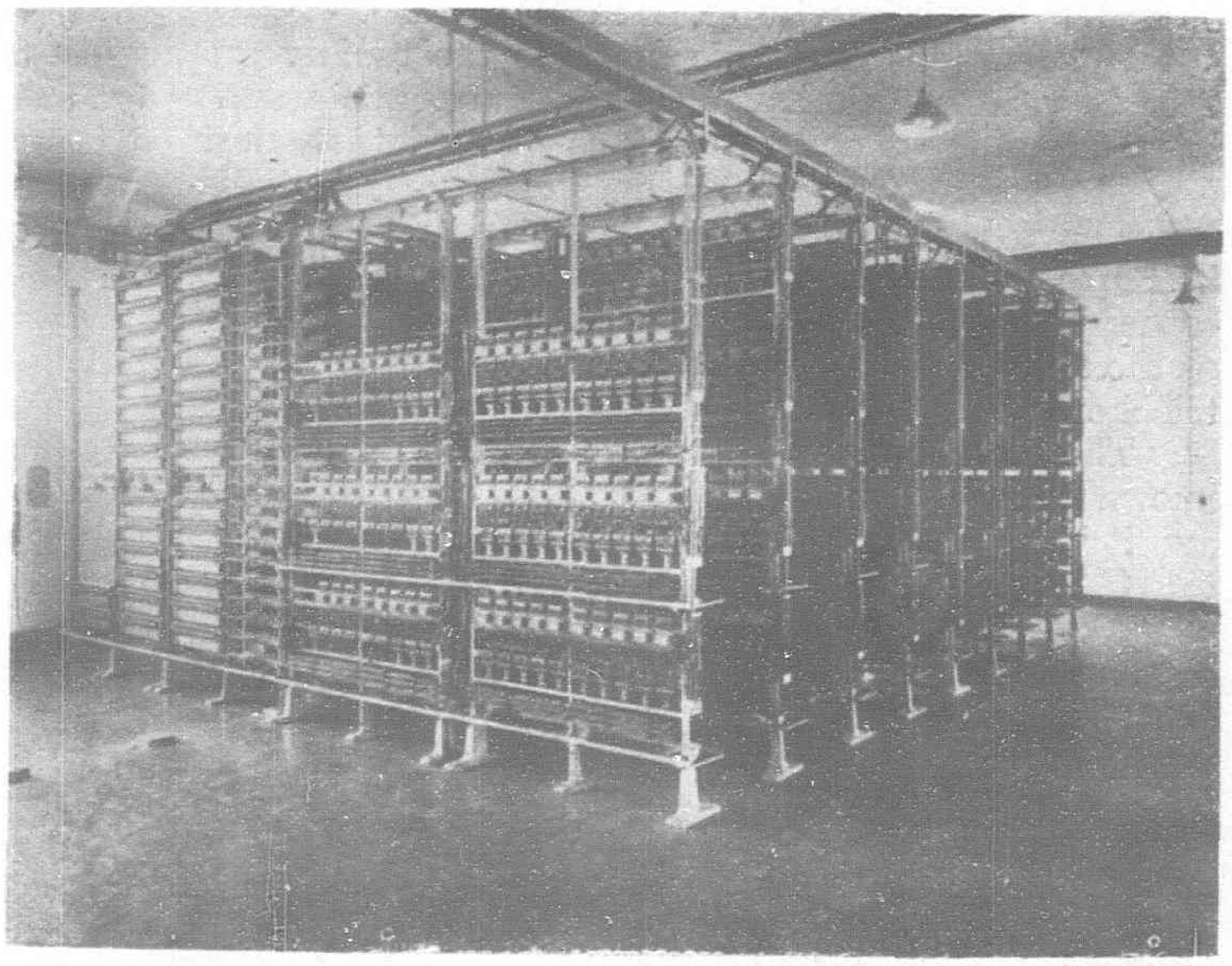


Fig. 4.—Rear View First Preselector and Connector Racks (Line Units)

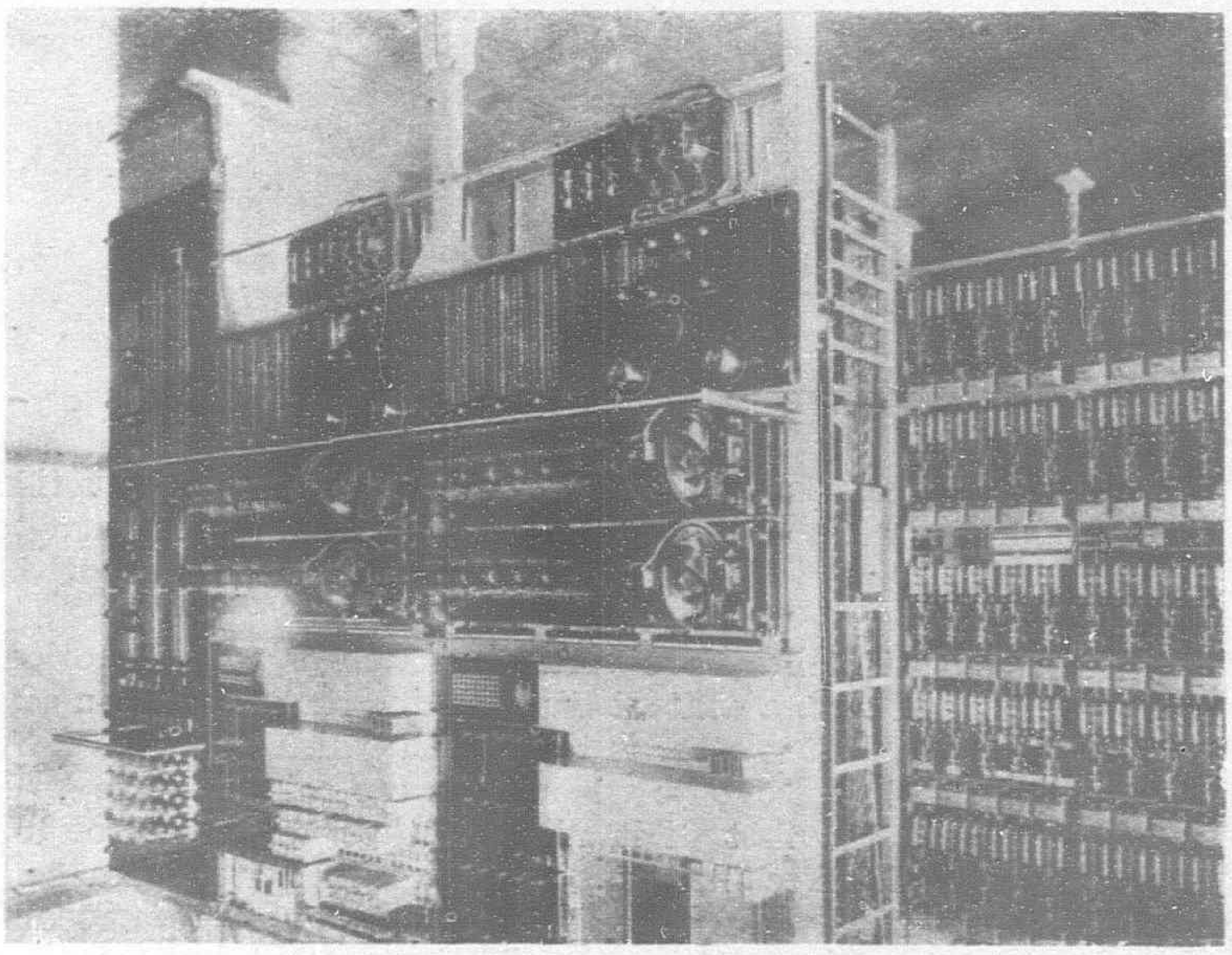


Fig. 5.—Motor Interrupter Racks and Fuse Panel

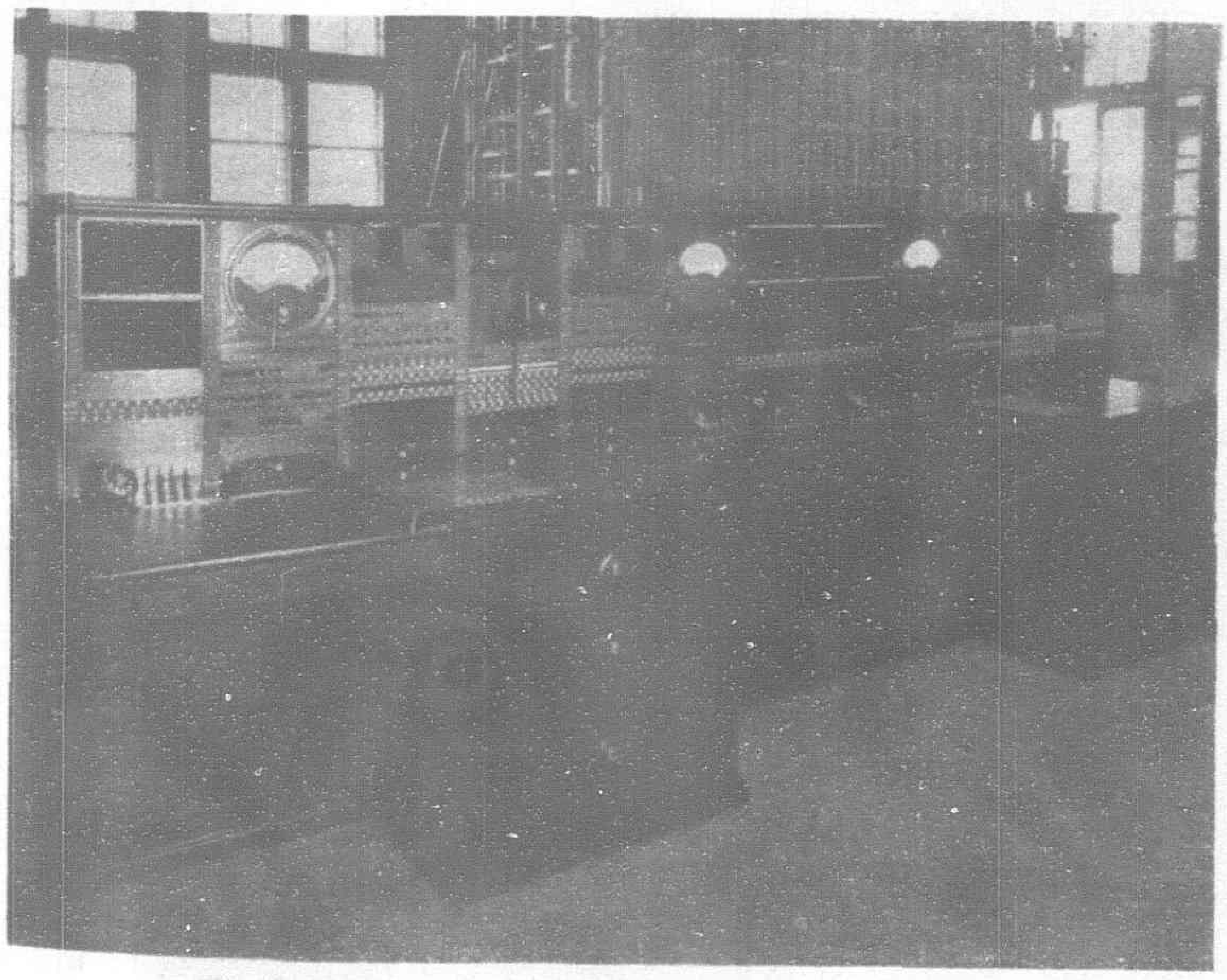


Fig. 6.—Test Desk and Distributing Frame

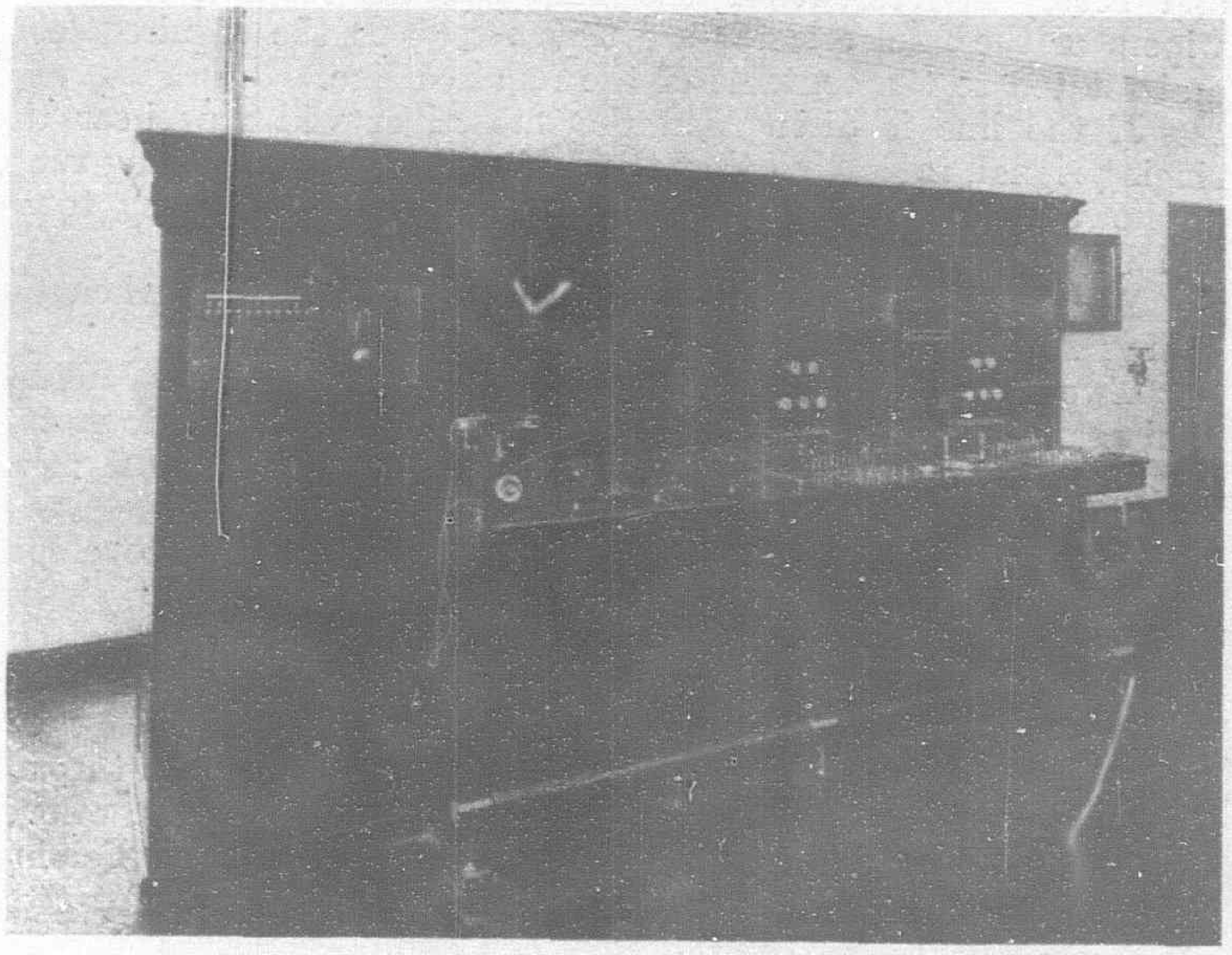
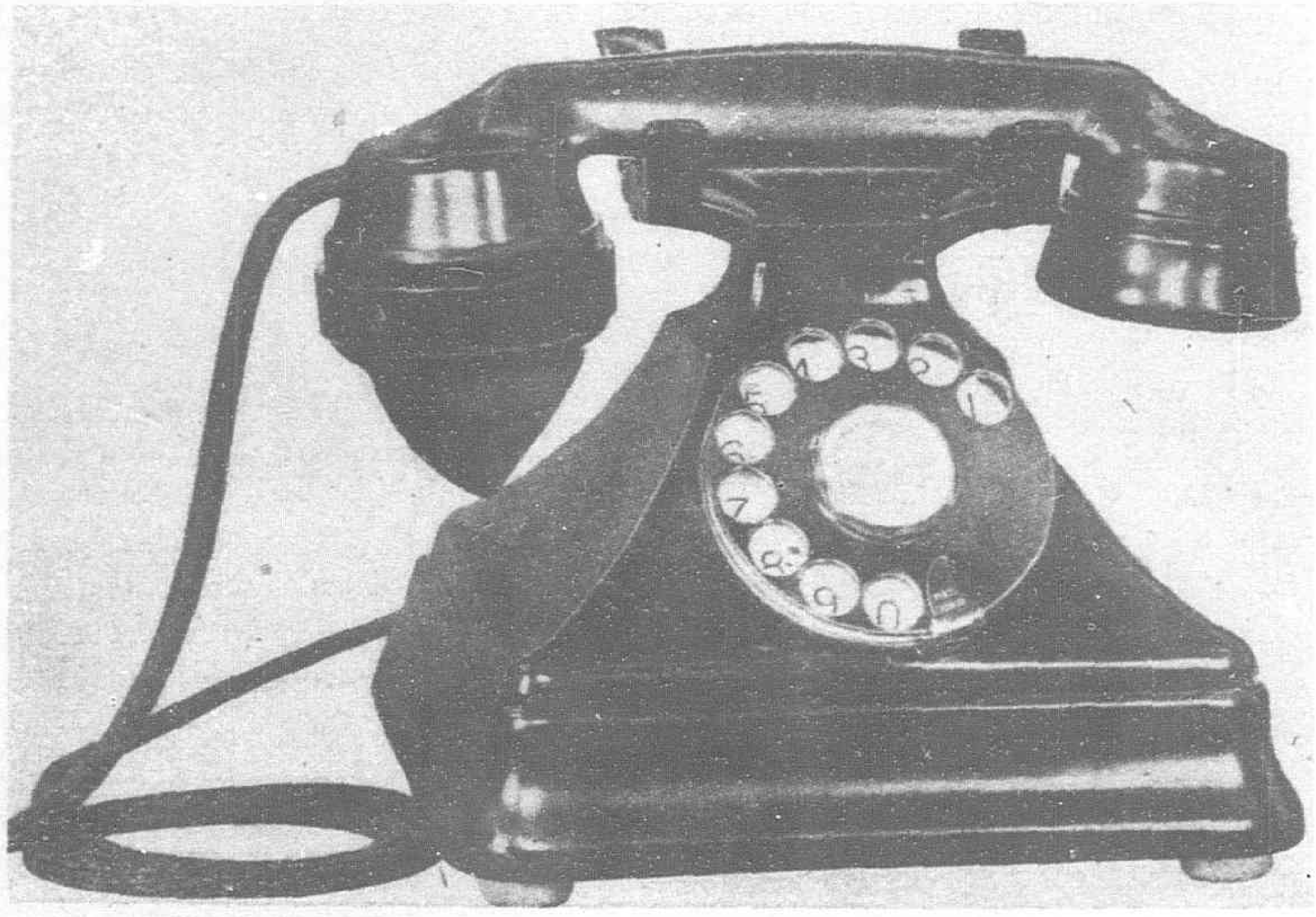


Fig. 7.—Long Distance Toll Board

"Neophone" for use with Separate Bell Set



"Neophone" Complete with Bell Set

of operation of both first and second pre-selectors is only a fraction of a second, so that the subscriber's line is extended through to a disengaged " First Selector" by the time he has raised the receiver to his ear.

All Selector Switches have vertical as well as rotary motion. Each is associated with a contact bank having ten rows of ten sets of contacts. The first selector is the switch which is operated by the first train of impulses ; its wiper arms are raised to the level corresponding to the first digit dialled ; they are then rotated automatically until a free line to the next selecting switch is reached.

When the subscriber dials the second figure, the Second Selector is operated in a similar manner to the first, but this time extending the line to a " Final Selector" (Connector).

The third and fourth trains of impulses control the vertical and rotary movement of the final selector respectively. The wipers of the final selector are thus raised to the required level and rotated to the contacts of the required line.

If the line is disengaged the subscriber will now hear the ringing signal, indicating that the desired subscriber is being rung. If, however, the called subscriber is engaged, the " busy tone" will be heard.

All switches are automatically returned to normal when the calling subscriber hangs up his receiver.

Two motor Interrupter Racks are provided with the Mukden equipment (Fig. 5), each rack being equipped with duplicate motor-interrupter machines (for alternate use), switches, fuses and other equipment associated with the driving circuits.

The Test Desk (Fig. 6) is of a new design, recently developed by Siemens Brothers & Co. ; it is built up in sections in a similar manner to that followed in the case of a manual switchboard and is thus readily extensible and provides particularly good access to all apparatus both at front and rear.

By dialling " O " the automatic subscriber is switched through to a toll operator at the long distance Toll Board (Fig. 7), whence he can obtain connection with any desired subscriber in Peiping, Tientsin, Harbin or Kirin. At present, as can be seen from the photograph, only half of the Board is equipped with apparatus. The Manchurian authorities, however, are planning to build many more long distance lines in the near future, when the full capacity of the Toll Board will be utilized. The clock-like apparatus mounted on the 5th and 8th panels is used for measuring the length of each conversation in periods of three minutes, a unit charge being made for every three minutes taken.

Communication is obtained with the automatic telephone system, in the Japanese leased territory, by dialling " 8."

In connection with the Mukden Automatic System, a point worthy of special mention is Siemens Brothers' latest pattern telephone instrument, known as the " Neophone," which the makers claim, and not without reason, to be the most efficient telephone in the world. The " Neophone" is a hand micro-telephone pattern instrument of the moulded type and, together with a very pleasing appearance, incorporates many new electrical and mechanical improvements.

The " Neophone " has been standardized for use by the British Post Office, after exhaustive tests of all other telephone instruments, and an order for some 100,000 of these instruments has been placed with Messrs. Siemens Brothers & Co. It has also been adopted by the Union of South Africa and many other telephone administrations.

The " Neophone " is protected by a number of World patents, the chief of which is in connection with the new " immersed-electrode" inset transmitter which, it is claimed, sets a new high standard of transmission efficiency and articulation.

Messrs. Siemens Brothers recently completed a large contract for the conversion of the Hongkong Area to automatic working. The Hongkong automatic telephone system consisting of three exchanges and totalling in all nearly 13,000 subscribers lines, was opened to public service early in May, 1930.

Mukden adds one more name to the rapidly growing list of Chinese cities which have adopted automatic working for their telephone systems and, when it is realized that, during the past few years, more than 40,000 lines of automatic telephone equipment have been installed, or are now in course of installation, in China (without including installations in the various foreign concessions etc.) some idea is gained of the favor that this modern method of operation has won for itself amongst purely Chinese telephone administrations.

There are two widely divergent automatic telephone systems, known as the " Strowger " and " Rotary " systems respectively, and it is the former that has, for the most part, been favored by the Chinese authorities.

A list is given below of the various cities in China which have adopted automatic working, together with the approximate number of subscribers' lines and the type of system employed :

Nanking	5,000	Subscribers'	Lines—Strowger	System
Greater Shanghai :				
Nantao-Exchange, 3,000 Chapei-Exchange, 1,500 Pootung-Exchange, 300	4,800	do.	do.	do.
Hankow :				
Main Exchange, 4,000 Branch Exchange, 3,000 Wuchang Exchange, 1,500	8,500	do.	do.	do.
Tientsin	9,000	do.	do.	do.
Harbin	3,000	do.	do.	do.
Foochow	600	do.	do.	do.
Changzu	600	do.	do.	do.
Mukden	3,500	do.	do.	do.
Canton	3,500	Subscribers'	Lines—Rotary	System
Hangchow	3,000	do.	do.	do.
Total ..	41,500			

Regarding the various foreign concessions and leased territories in China.

The Japanese Government, who in 1924 adopted the Strowger System for all future automatic work in Japan, have installed this same type of equipment, totalling in all about 12,000 lines, in Dairen, Mukden (Hoten), Changchun and Fushun.

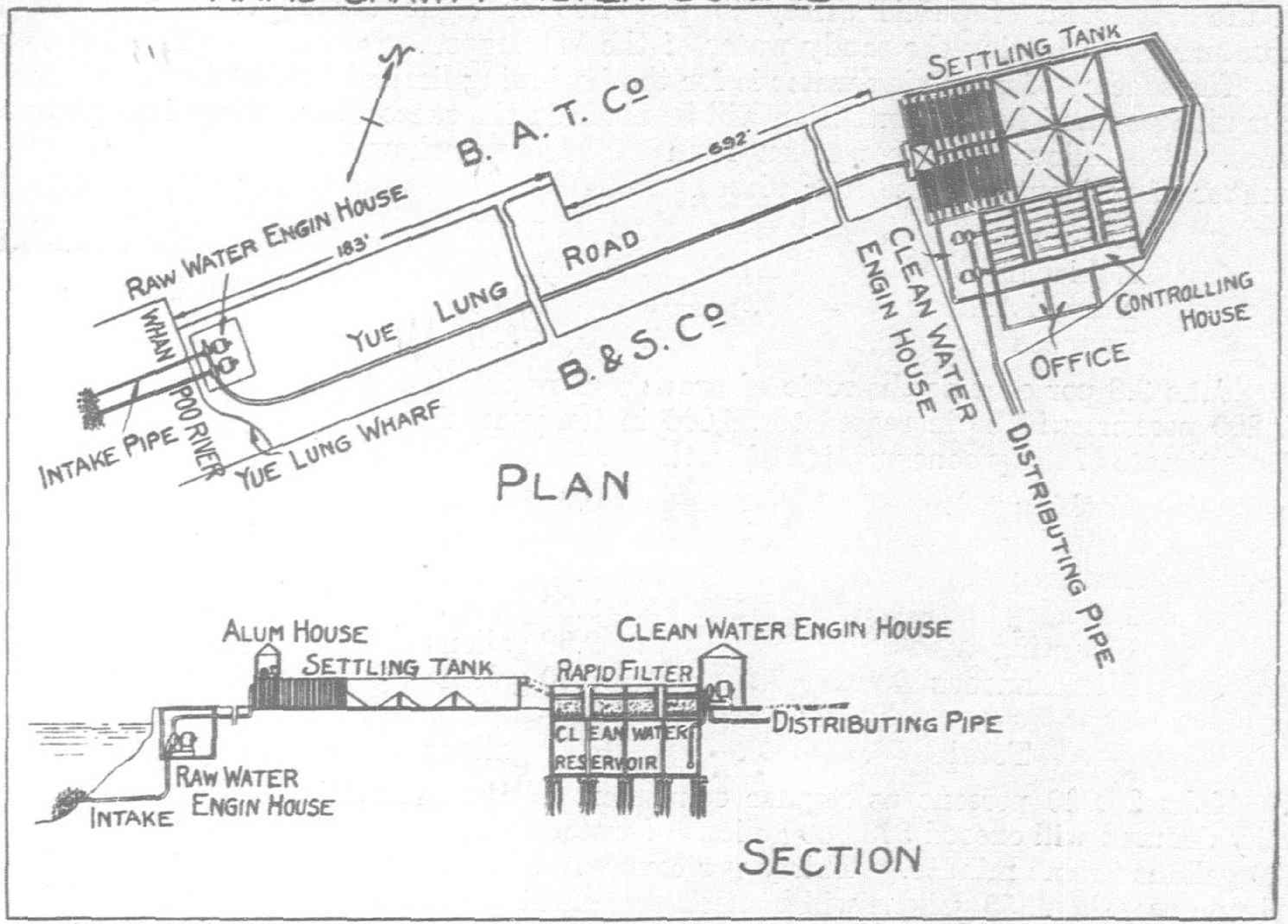
Similarly, the Hongkong Telephone Co. have followed the lead of the British Post Office, who have also exclusively adopted the Strowger System for the whole of Great Britain, and have, as previously mentioned, recently converted their entire telephone system, about 13,000 lines, to Strowger automatic working.

The Shanghai Telephone Co., on the other hand, installed a small exchange of the " Rotary " type some years ago and to-day have about 10,000 lines of " Rotary " equipment operating in Shanghai, with further equipment of the same type in course of installation.

PROPOSED WATERWORKS FOR POOTUNG

YIH CHIH UEN

RAPID GRAVITY FILTER SCHEME



BY COURTESY OF PUBLIC UTILITY BUREAU

There is no service which affects the public as a whole more than that of the water supply of a city. Lighting, heating and even sewerage are minor factors in a community's well-being as compared with the adequateness or otherwise of the water service, and greater responsibility is, therefore, thrust upon those who have the control of this important branch of public utility. The supply of potable water for the people residing in Pootung has been a problem that has occupied the attention of the municipal authority for many years. In a geographical sense, the district of Pootung should be included in the area of Greater Shanghai, but for the present purpose the scope of this article is only limited for the discussion of that district to have a separate waterworks deriving its intake, like the other four waterworks serving the great community of Greater Shanghai Proper, from the stream of Whangpoo River.

The district of Pootung, embracing six villages (*viz.* Kaochao, Kaohong, Lohong, Yangching, Tangchao and Yangtze) and the adjacent thickly populated water front reaching to the end at Changkiapang, derives its water supply either from the natural stream or supplemented by well water, which in early days ample for the requirements of the place. But with the gradual increase of population as well as that of the establishment of various factories at the place the supply fell far short of the local demand and Pootung had to have recourse to other means.

With a view to the meeting of the increasing demand for water for domestic and industrial uses, the Bureau of Public Utility has made out a plan for the installation of a new water plant with modern distribution system. The purification and pumping plants as well as the distribution mains have necessarily to be designed to deal with heaviest demand that may be put upon them. The location of the waterworks are to be in Laneetu, Yangching, where business is most prosperous and population most dense as compared with other parts of Pootung.

According to the latest census made by the Finance Bureau, the population of Laneetu has already reached 5,850 ; and the land tax for the current years is listed below :

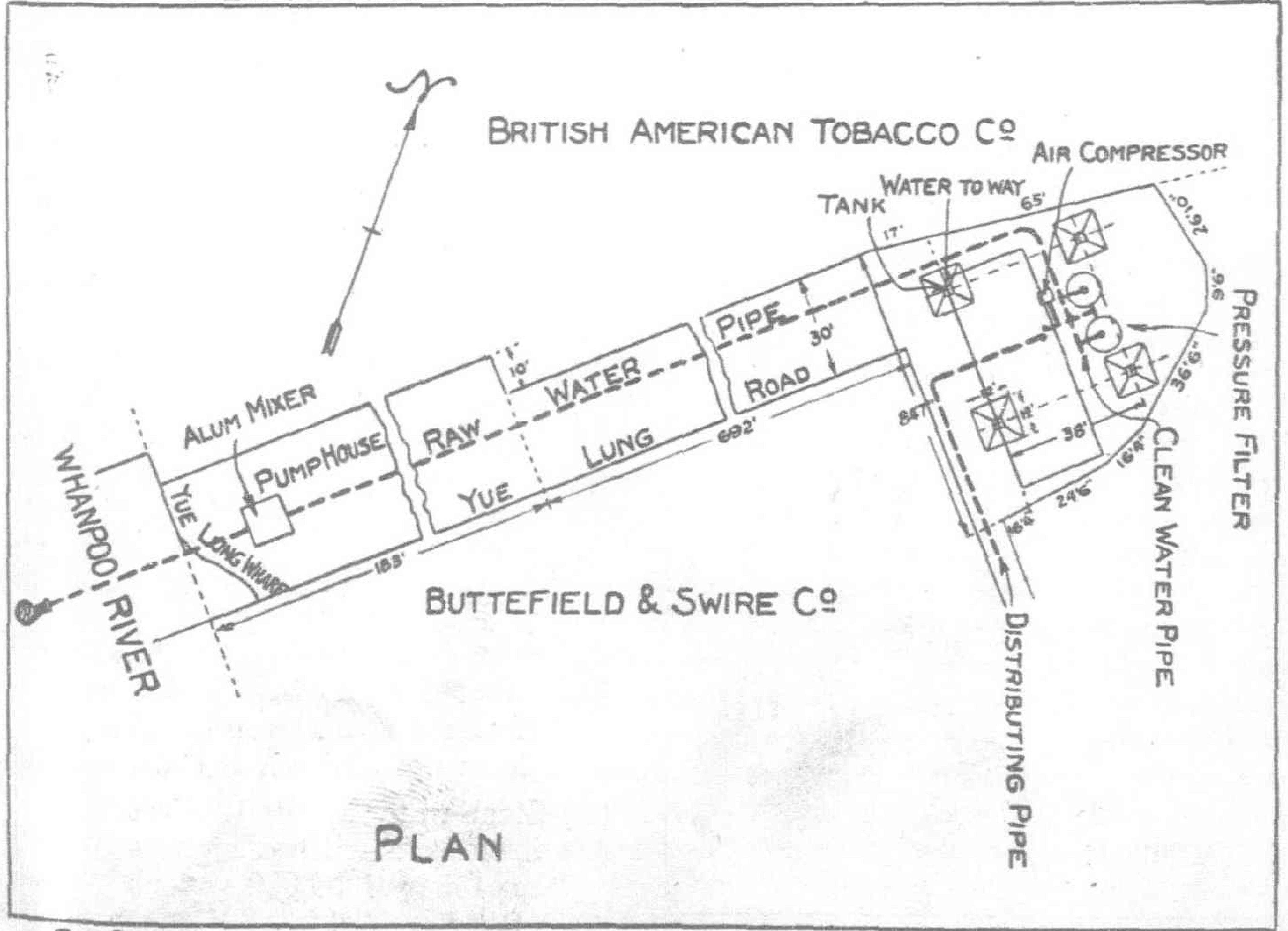
1928 Winter	$2,801.25
1929 Spring	$4,325.05
1929 Summer	$4,122.67
1929 Autumn	$4,282.31
1929 Winter	$4,314.71
1930 Spring	$4,329.92

It is also reported that the present value of land in Pootung ranges from $1,000 to $5,000 for one mow, while those of Shanghai Bund, right opposite to Laneetu, has already reached $300,000 per mow. The rumor that Shanghai will have its surplus population removed to the east of Whangpoo River, as the condition which prevailed in New York City and Brooklyn, has recently current. There is every reason to believe that the district of Pootung will be developed and the value of land as well as its land tax will be accordingly increased five to ten times as they are now, provided that the supply of potable water has been safely and efficiently guaranteed.

However, to start the waterworks is not a profitable investment, which, in foreign countries, are always initiated by governmental authority with public revenue. But at present the municipal treasury here is not in the position to have any surplus revenue to help the far-sighted merchants, who are desirous to develop that place. The Shanghai Waterworks Company has shown much intention to extend its business to Pootung, and a recent information from reliable source has been made known that the negotiations between the Bureau of Public Utility and the Shanghai Waterworks Company have started to discuss the matter.

Owing to the turbidness of the interior small creeks, the resident of Pootung obtain their drinking water from the Whangpoo River which is brought by water carriers at the price of eight to ten coppers for two tubs (approximately ten gallons), which in Shanghai cost only one

PRESSURE FILTER SCHEME



BY COURTESY OF BUREAU OF PUBLIC UTILITY

and one half coppers. It is not only uneconomical but dangerous on the standpoint of public safety to pay five or eight times more money in buying the sandy water of the Whangpoo.

The scheme of supplying water is for the beginning limited to four villages; and further extension will be made in the succeeding years. The following figures taken from 1929 census show the number of resident of these four places.

Laneetu	5,850
Lokiachih	2,210
Yangkiatu...	4,850
Laupetu	4,350

Take 3.8 per cent as the ratio of growth of population, these 17,200 persons will be increased to 25,000 in ten years from now. The estimate of daily consumption of water per capita is as follows:

Cooking	0.75 gallon
Drinking	0.33 gallon
Bathing	5.00 gallons
Laundry	3.00 gallons
Cleansing	2.92 gallons
Miscellaneous	3.00 gallons
Total	15.00 gallons

Take 25,000 persons as regular consumers of the place, the daily demand will exceed 375,000 gallons of water or an average of 260 gallons in one minute. Thirty per cent will be added for fire brigade use, then 350 gallons will be needed to meet the demand in a minute.

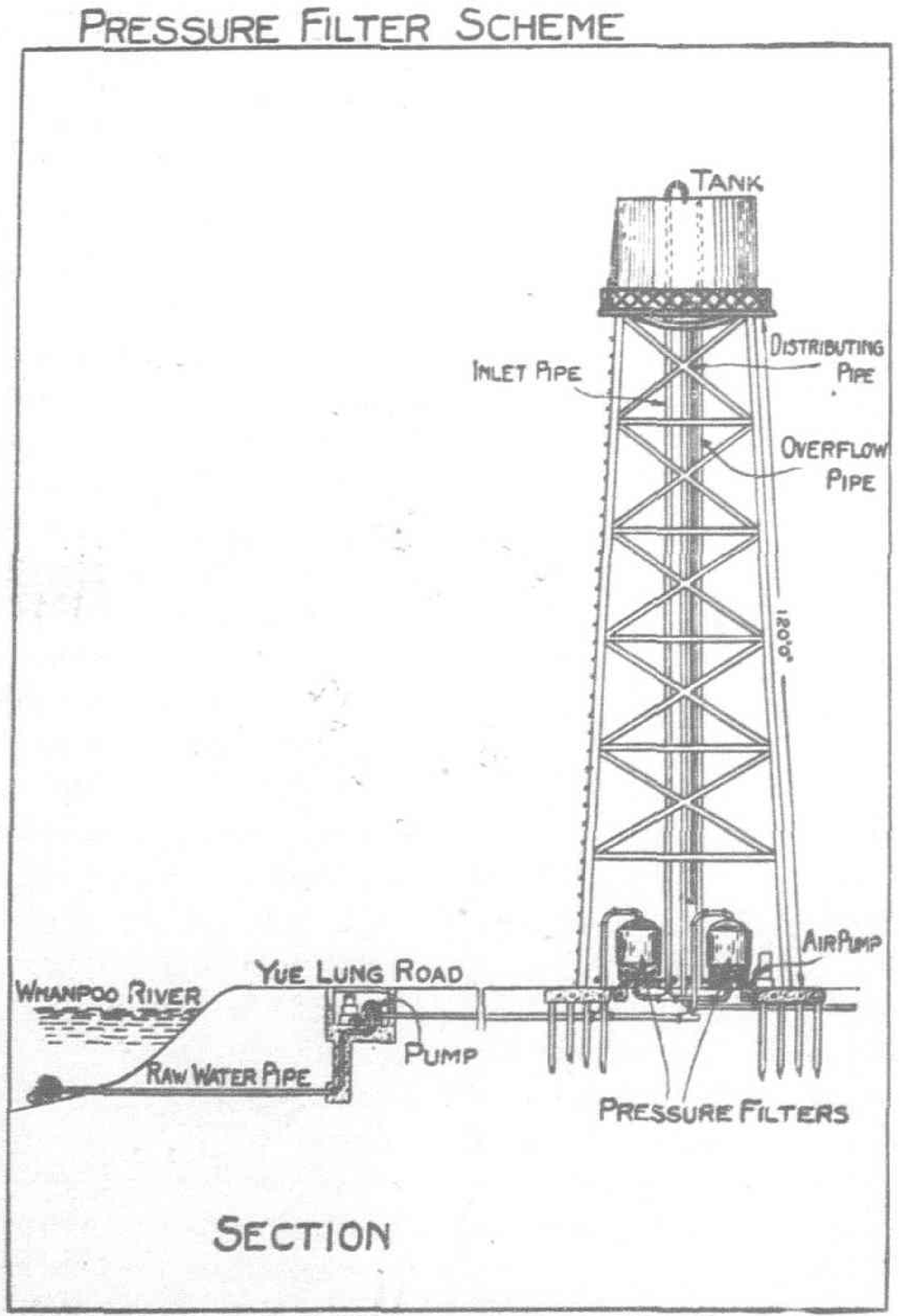
The equipment of the hydraulic machines will include the most modern devices for filtration and some powerful pumping machines. The intake for the unfiltered water will be advantageously situated on the Whangpoo foreshore at Yue Lung Road and consists of three chambers, one of which is used for pumping raw water to the settling tanks, the other two are served for the chemical purification and for circulating water to the turbines, respectively.

Two settling tanks will be built, through which the water passes continuously A small dose of alum, in proportion to the quantity of silt contained in the water, will be added at the entrance of the raw water to well baffled chambers before it passes into the settling tank From the settling tank the water passes into the so-called Rapid Gravity Filters, a type of filtration plant generally used in modern practice. This consists of a battery of three filters from which the filtered water flows into the clean water reservoirs below the settling tank and the filters. To the filter plant is attached a building for the technical office and laboratory.

From the clean water reservoirs the water flows to the pumping house from where it is pumped by powerful machinery into the water tower which contains two water tanks, the lower one for the wash water for filters and the upper one for the distribution of water to the population of the district.

It is also proposed that pressure filters may be employed on account of its rapidness of filtration, its cheaper cost and that it occupies a smaller place as compared with the rapid gravity filtration method. By this pressure filtration, the water is pumped from the river by a group of two electrically driven centrifugal pumps with a capacity of 520 gallons per minute. At the outlet of these pumps is added a small quantity of sulphate of aluminium to act as coagulant to enable the precipitation of most of the impurities contained in the water. After mixing with the coagulant, the water is carried to the chlorine engine house to complete the bacteriological purification, thence conducted to the filtration plant. The filtered water is pumped to the water tower of 63,000 capacity, in which the tank is located about 120 feet above the ground level, and which, as well holding a reserve supply of water of the place, serve as pressure regulator between the pumping system and the distribution main.

PRESSURE FILTER SCHEME



BY COURTESY OF BUREAU OF PUBLIC UTILITY

The first step of the scheme, at the beginning, will be carried out at three hundred and fifty gallons per minute. The length and the size of the pipes to be used may be seen in the following list:

	Length		Discharging Capacity per Minute		Diameter of Pipe	Velocity of Discharge	Loss Due to Friction (foot)		Water Pressure At Every Point		
Section	Meter	Foot	Gallon	Square Foot	Inch	Foot (per Second)	In Every 100 ft.	In Every Section	Point	Foot	lb. per sq. inch
XA	300	984	350	56.16	8″	2.68	0.40	3.94	A	101.16	43.76
AB	300	984	100	16.05	6″	1.36	0.16	1.57	B	99.49	43.04
BL	650	2133	40	6.42	4″	1.23	0.21	4.48	L	95.01	41.14
BP	530	1739	40	6.42	4″	1.23	0.21	3.65	P	95.84	41.50
ADCE	1600	5249	250	40.12	6″	3.40	0.88	46.19	E	54.87	23.76
EF	200	656	100	16.05	6″	1.36	0.16	1.05	F	53.82	23.30
FQ	300	984	25	4.01	3″	1.36	0.35	3.44	Q	50.38	21.82
FGH	650	2133	65	10.43	4″	1.99	0.49	10.45	H	43.37	18.78
EM	200	656	15	2.41	3″	1.00	0.26	1.17	M	52.11	22.56
HK	330	1083	25	4.01	3″	1.36	0.35	3.79	K	39.58	17.14

The highest water pressure is generally fixed at 105 feet or 45 pounds in most of the waterworks companies.

The following is the estimate of initial cost for the installation of various machines to start the waterworks project in Pootung:

(A) INSTALLATION OF PIPES

(1) 8″ (diameter) pipe, 1,000 ft. ($5.60 a foot) ...	$ 5,600
(2) 6″ (diameter) pipe, 7,000 ft. ($3.60 a foot) ...	25,200
(3) 4″ (diameter) pipe, 6,000 ft. ($2.30 a foot) ...	13,800
(4) 3″ (diameter) pipe, 2,800 ft. ($1.80 a foot) ...	5,040
(5) 40 Hydrants ($100 per hydrant)	4,000
(6) Compensation for excavation	3,000
(7) 200 water meters	5,000
(8) Big water meters	500
Total ...	$62,140

(B) INSTALLATION OF HYDRAULIC MACHINES

1. *Pressure Filter*

(*a*) Two 8″ diameter pressure filters each discharging 130 gallons of water every minute		
(*b*) One alum tank and mixer		
(*c*) One set chlorine apparatus		
(*d*) One chlorine pump with one ½ h.p. motor		
(*e*) Other parts of the above machinery and connecting pipes Total of the above five items ...	Tls. 4,080	$5,712
(*f*) One 3½″ × 4″ Washington air compressor ...	,, 160	224
(*g*) One 30″ × 6′ air tank	,, 250	350
(*h*) One 3 h.p. motor with leather belt	,, 125	175
(*i*) Two 3″ S.D. Washington centrifugal pumps each having the capacity of discharging 260 gallons of water per minute and pumping to a height of 120 feet U.S. $1,058 ...		3,703
(*j*) Two 25 h.p. motor, 220 volts, 1,750 r.p.m. U. S. $492		1,722
(*k*) Two concrete foundations for (*j*) motors Tls. 185		259
(*l*) Labor for the installation of the above eleven items (from a, to k.)		2,000
(*m*) Steel water tank, 120 feet in height with a storage capacity of 36,000 gallons of water Tls. 21,200 ...		29,680

(*n*) Reinforced concrete settling tank with 1,000 feet of 6″ diameter pipe	$16,500
(*o*) Miscellaneous	2,000
Total	$62,325

2. *Rapid Filter :*

(*a*) Two reinforced concrete settling tanks	$20,020
(*b*) Two reinforced concrete rapid filters	20,400
(*c*) One reinforced concrete reservoir	10,000
(*d*) Raw water engine house with pipes	12,540
(*e*) Pumps and motors	6,750
(*f*) One chlorine engine	2,000
(*g*) Electricity and other expenses	2,000
Total	$76,710

3. *Miscellaneous :*

(*a*) Constructions for walls and houses	$ 5,000
(*b*) Engineering management	13,000
(*c*) Interest for the capital during the first year construction period	9,000
(*d*) Operation expenses	1,000
Total	$28,000

For the expansion of the waterworks, the scheme has also included an estimate for the yearly increase in buying necessary equipments.

(1) 6″ and less than 6″ pipe, 2,000 feet	$5,000
(2) Five hydrants	1,000
(3) Two hundred water meters	5,000
(4) Compensation for excavation	1,000
(5) Tools and machinery accessories	2,000
(6) Salaries for new employees	1,000
Total	$15,000

The development of the waterworks must proceed with the increase in population of the place, so that it may always be amply sufficient to supply the need of the people. This scheme must therefore have an estimate of the maximum demand of the district of Pootung. At the same time consideration must also be drawn to the probable income so as to balance the daily expenses and losses due to depreciation.

The scheme also provides for the use of water by the fire brigades. As stated above, the water tank has the storage capacity of 63,000 gallons which will be able to supply of one fire engine for five continuous hours, two for two and half hours and four for one whole hour or more. The system will be equipped for a height of more than twenty feet water pressure at the farthest point of the distributing pipes. No difficulty will occur to avert big calamity of fire, since all the constructions in Pootung are not more than two storeys in height.

There are two kinds of filter-beds—pressure filter and rapid gravity filter, either of which will be chosen for adoption in the Pootung waterworks. The pressure filter scheme is comparatively simple and occupies less space. The Robert Dollar Wharf at Laneetu adopts this method for its own water consumption. Usually smaller waterworks choose the pressure filtration process. The rapid gravity filter scheme take much bigger space and is more complicated in laying out the plant. However, it occupies only one fiftieth of the space which would be occupied by the slow sand filter. The local waterworks in Shanghai all use the rapid gravity filter.

At the time when the Pootung waterworks scheme was laid out, the currency exchange was forty-five gold dollars for one hundred Shanghai taels. The laying of pressure filter-beds was estimated at Mex. $147,300 ; while that of rapid filter-beds at Mex. $161,300. Owing to the fact that the currency exchange varies very much during short instances, it is difficult to give the exact estimated cost. The apparatus used in pressure filtering process has to be entirely bought from foreign countries, therefore the silver slump affects the previous estimated cost greatly. The rapid filter-beds are built of reinforced concrete. Native manufactured cement may be used ; only the steel has to be purchased from abroad. Therefore the estimated cost of rapid gravity filter scheme is much more exact.

Method	*Rate of Exchange*	*Total Estimate Cost*
Pressure Filter	At G. $45 per Tls. 100	$147,300 (local currency)
Pressure Filter	At G. $40 per Tls. 100	$152,000 (local currency)
Rapid Gravity Filter	At G. $45 per Tls. 100	$161,300 (local currency)
Rapid Gravity Filter	At G. $40 per Tls. 100	$166,000 (local currency)

When the exchange rate is at G. $34 per hundred taels, both methods will cost over $170,000. If the rapid gravity is adopted the quality of water will be better improved than pressure filter can do.

The Muehlacker Wonder

Europa's Most Powerful Broadcasting Transmitter

With an output in the aerial of 75 kilowatts, the broadcast program of the new Telefunken station rushes out into the ether. There's no need for long searching over the scale of the receiver, Europa's most powerful transmitter cannot be overheard.

What, however, is the meaning of 75 kilowatts aerial output ? 75 kilowatts is equivalent to 100 horse-power ; the power is used, for instance, by the electric light works to feed 3,000 light bulbs—a comparison which everyone can very easily imagine. But what happens to the 100 h.p. that is pumped into the Muehlacker aerial ? Something incomprehensible. This hundred h.p. does not remain in the wires in which it flows. The greater part leaves the aerial and is driven into space, *i.e.* broadcast. It is this part that brings into the ether the strange wave-like movement which spreads in all directions with the speed of light and which brings speech and resonance to innumerable receiving sets on all sides.

These inimaginable broadcast—and power transmission to tremendous distances cannot be achieved with any sort of current in the transmitting aerial. It must be a current which changes direction as often as possible, hundreds and thousands of times in the second. The usual slow alternating current from the electric light mains could not be broadcast and direct current would not even flow through the aerial.

A Wireless transmitting station is thus really a transformer plant which changes the usual a.c. or d.c. from the mains into tremendously quickly-alternating or as it is called " High frequency" current.

In Muehlacker for instance the current from the mains which alternates 50 times in the second is transformed into current with 833000 impulses in a second. The change takes place in so-called electron valves. These are glass tubes pumped free from air and containing several electrodes. In Muehlacker there are 25 of these fantastically formed dull-glowing glass valves in large metal stands.

However, letting loose the energy of 75 kilowatts does not mean that a broadcasting station is in order ! This power must be controlled. It must oscillate in tune with speech and music. It must, for instance on the note A 400 times a second increase and die away to nil. Easily said but not so easily done. How can the singer who can fill a large concert hall with his voice, control 100 h.p. with it ? Again the solution is the electron valve with its manifold uses. The sound oscillations of speech and musical instruments are changed by the microphone into weak current oscillations which are amplified to a certain extent and then transmitted by cable to the broadcast transmitter where they are again amplified many thousand times in several stages and then impressed on the aerial current and thus into the ether on the broadcast electron-magnetic waves, all by means of electron valves. In this way the miraculous result is brought about that the weak human voice can control the 100 horse-power of the transmitter and speech and music can be heard by a gigantic audience of wireless listeners.

The Three-in-One Radio Miracle

From the day of it's discovery scientists have continually devoted all their energy so that the people all over the world may get the full benefit of their additional developments. Stage by stage have we become accustomed to its improvements. The layman has taken these improvements as a matter of fact, but the scientist never stopped. Every improvement means a wider and a better field for the future development of Radio power. And to think that on the invisible wings of Radio Goodwill, Tolerance may be sent to all parts of the World, sped from one crowded city to another. A Farmer in a lonely farm house in the Middle West of the United States gathers his family around the loud speaker and enjoys Music, Speeches, Lectures, a Sermon on Sunday, and daily Stock Reports, and he is not only listening in to what is going on in his own country, but practically every corner of the Earth. We are living in an age of miracles. The radio has destroyed space, and anihilated time. To-day the world is smaller. Nations come closer together. Boundaries fade into mere lines on a map. People of one country get to know the people of other countries. They learn of each other's sorrows, their pleasures as well. There must result a mutual feeling of sympathy, forbearance, and goodwill, which will result in a common understanding in their respective countries.

Here is the newest miracle of recording science, unique and inovating in principle. Infinite in it's possibilities, and of course for the first time in history, it is possible—right in your own home to record the sound of your own voice, to make permanent records of those who are always near and dear to you.

The Victor Home Recording combined with Victor Radio Electrola R.E. 57, records any sound no matter by whom created may be instantly played the moment it is made. No need for developing. The self-same instrument that listens to your voice repeats at once the words that you have formed.

The mechanism is so small, compact, that it makes easy to operate and convenient to use.

Chief among the sensational refinements in the 1931 Electrola Radio is the recently perfected inertia " Tone Arm and Pick-Up," developed after long and diligent research in the Victor Laboratories at Camden, New Jersey, U.S.A., by means of this exclusive mechanism the music—in all its beauty, power and richness is transported into this new machine, and to the consumer. Among other improvements include the new Victor super-dynamic amplifier system and the automatic control by which the record turntable is started and stopped. The amplification system of which the new super-dynamic corrugated cone speaker is an all important unit, is as necessary to record reproductions as to radio. The automatic control provides a feature entirely unique ; turntable operations without the usual lever.

Maximum Selectivity—The ruling out of overlapping stations. It is considered a great feat of engineering to attain maximum selectivity in a radio without loss of tonal beauty. But in it's newest musical instrument Victor gives you a clearer definition of radio stations than any other radio, and in this, in spite of a new tone quality of a marked and thrilling pre-eminence. The amasing amplification of distant radio signals which requires Phenomenal Sensitivity is incorporated in this new machine, the range of reception is immediately widened. One actually gets more sensitivity than the instrument will ever need. Remote stations barely audible in the past are now tuned in with ease and with entire satisfaction. Feeble radio programs are steeped with power and volume. Hence we derive a straight line tuning and with one emotion tuning dial. Then there is the Tone Control, while previous models have been invented, the latest model is in front of the cabinet and is so perfected and immeasurably improved that with the new invention the individual himself is at the baton, he emphasizes for instance the bass, fortifies the treble, cuts down static and interference that may come from outside elements. Even matches down the station tone to the accoustic of his own room.

This new Three-in-One machine will enable the Shanghailander to sit in his room after office hours, enjoy a concert given in the Philippine Islands or Japan, Paris or San Francisco, London or Berlin. Reproduce his own voice, the voice of his friends and those of his friends he cares to have recorded in his album for the years to come. But he will also have the daily reports as to the various stock markets of the world. Truly a remarkable invention which has arrived in this part of the world in the right time and the right place.

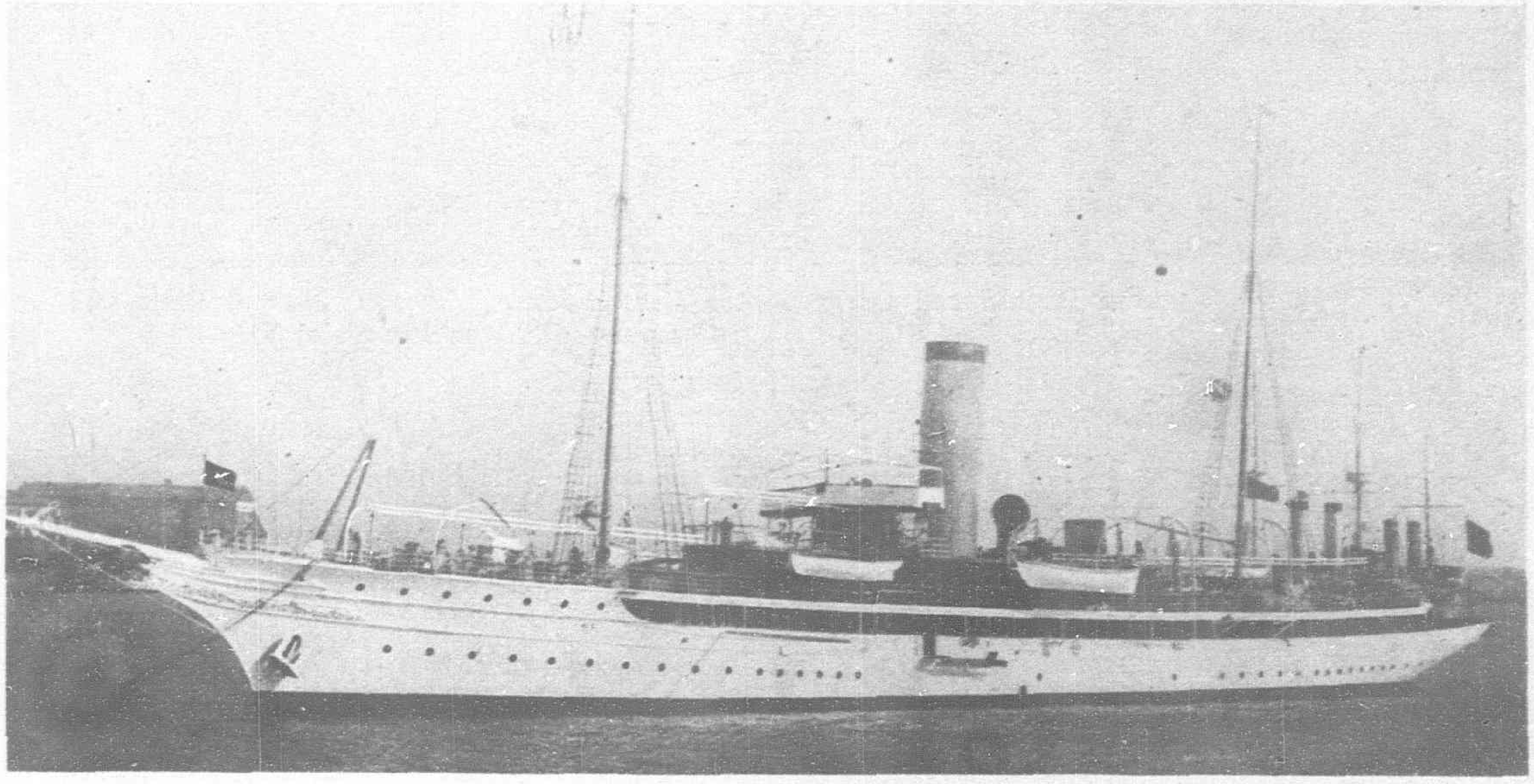
Edgar Allen Mine and Quarry Book : This is an amplified and revised edition, which discusses the Edgar Allen products for the use of mines and quarries, ranging from crushing and grinding machinery to rotary dryers, lime hydrators, replace parts in manganese steel, and other steels, hollow and solid mining drill steels, steels for granite, etc.

The new edition contains blue prints showing details of typical pulverizing and screening plant, and the working of various machines described in the book. It also devotes increased attention to the K.B. Pulverizer, the all-steel hammer mill, which is becoming increasingly widely used. This book should be of considerable value to all mining engineers and quarry managers, and a copy will gladly be sent on application to Edgar Allen & Co., Ltd., at the Imperial Steel Works, Sheffield.

Our readers will be interested to note that an arrangement has been made between Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, and the well-known Allis-Chalmers Manufacturing Company, Milwaukee, U. S. A., under which the former will manufacture at Sheffield and sell in certain parts of the British Empire and Asia various types of Allis-Chalmers Crushing and Grinding Machinery. The arrangement does not apply to Canada and the sales organization of the Allis-Chalmers Manufacturing Company in Paris, London and South Africa will not be affected in any way, but firms in the crushing, grinding and cement industries will have in many instances the advantages of the combined technical resources of the two companies together with British manufacture should they prefer it.

The Asiatic Marine Review

The Old "Atalanta," Now the Chinese Survey Squadron Leader, "Kanlu"

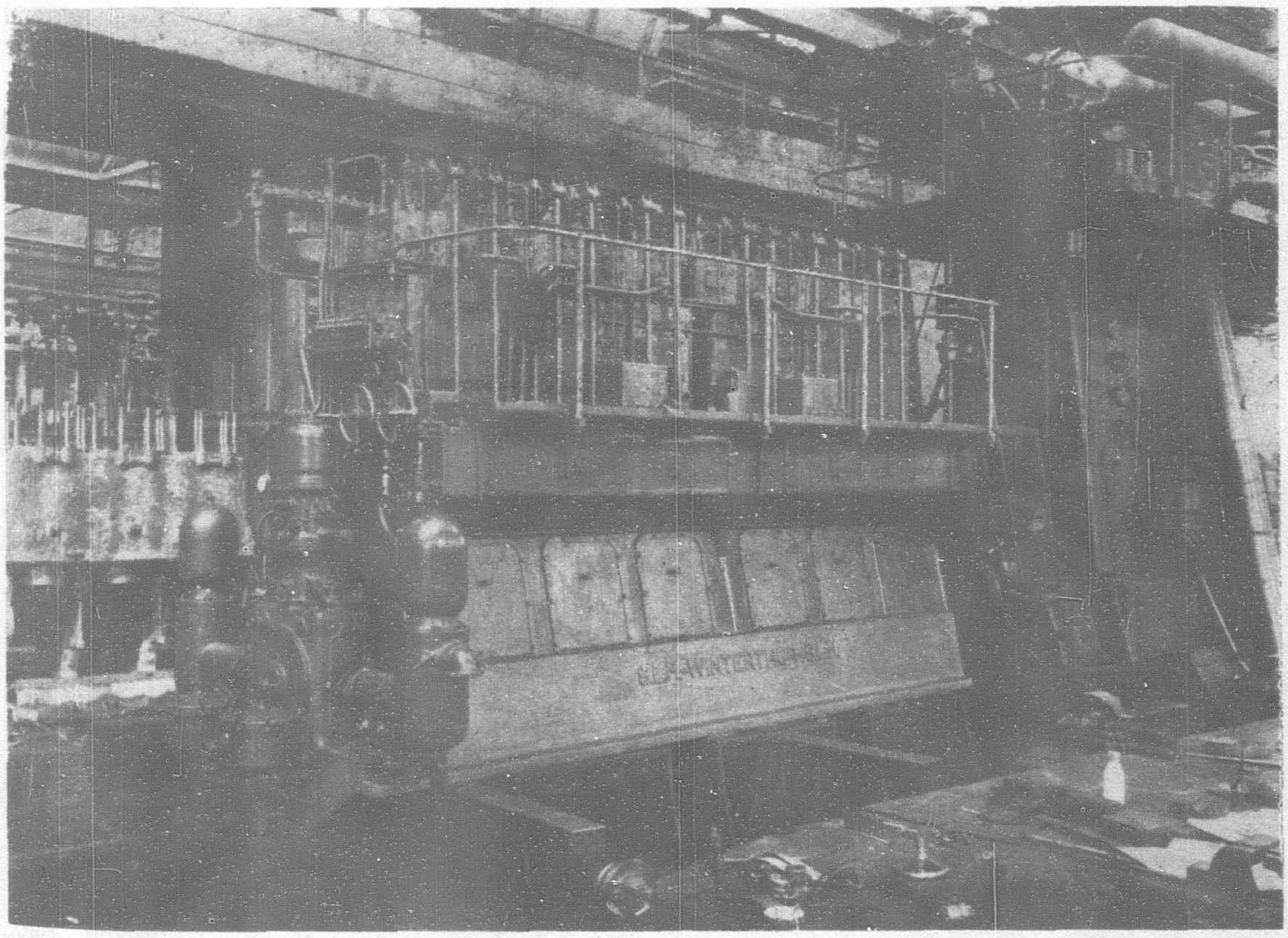


Chinese Government Survey Ship, "Kanlu"

The old *Atalanta*, once the pride and flagship of the New York Yacht Club, is now the Chinese Naval Surveying Ship *Kanlu*, having been acquired by the Ministry of the Navy about four years ago, and assigned to coast survey work.

Recently, she was converted from a steam to a diesel driven vessel by the installation of three 500 horse power Swiss locomotive Diesel engines having a voyage radius of 11,500 miles on one bunkering (300 tons). Recent speed trials proved her running cost for oil fuel to be only 85 cents per mile. This ship has been commissioned, by order of Admiral S. K. Chen, Acting Minister of Navy, to be the leader of the Surveying Squadron and will be engaged, together with five other vessels, in surveying the coast and rivers of China by the Hydrographic Department of the Navy. She is fitted with the most up-to-date appliances used now-a-days for the science of hydrography.

The three Diesel engines and auxiliaries were supplied by Messrs. Hugo Reiss & Co., local agents for the Swiss Locomotive & Machine Works, Winterthur, Switzerland, the oil burning Cochrane boiler supplied by the General Electric Company of China.



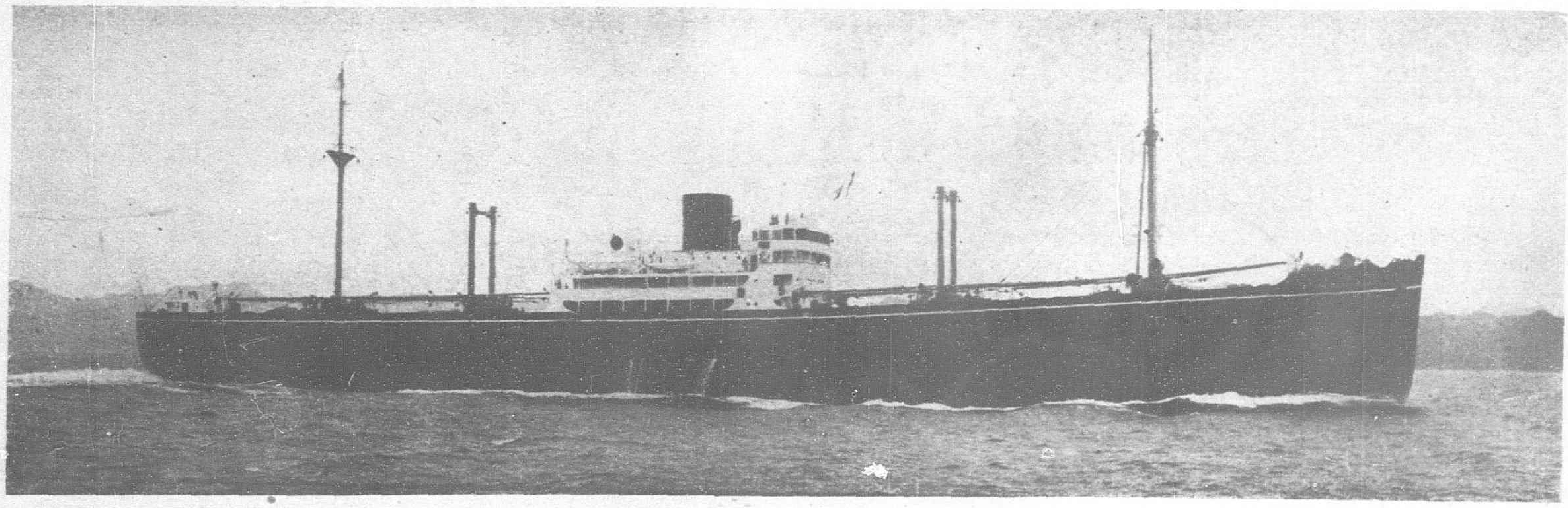
Diesel Engines of the Chinese Government Survey Vessel "Kanlu." Marine Type 6ND37,500 h.p. at 273 r.p.m. Manufactured by the Swiss Locomotive & Machine Works. Three of these Engines are Installed in the "Kanlu" Running 220 r.p.m. and Giving a Speed of 12¾ knots

Interior Reconstruction

The complete turbine machinery was dismantled and removed, new bunkers were built into the vessel having a capacity of 300 tons of fuel oil, large fresh water storage tanks fitted. The old turbine seatings cut out and special design seatings built in to suit the Diesel motors. The re-construction entailed being equivalent to about one-third of the interior of hull.

The installation and above work was carried out at the Kiangnan Dock & Engineering Works. Satisfactory trials were held at Woosung over the measured mile when a speed of 12¾ knots was obtained with only 1,200 b.h.p., this being well over the contract speed.

This type of machinery was specially selected by the Hydrographic Department as being most suitable for their work, giving a large variation of speed at economic rates, and the large radius of action enabling the vessel to remain at work without returning to Shanghai to bunker. This is the first diesel driven vessel in the Chinese Navy.



Latest Type of Japanese High-Speed Cargo Motor Vessel. M.S. "Kwansai Maru," Built and Engined by the Yokohama Dock Company, Ltd., on her Trial Trip

Japanese High Speed Cargo Motor Vessels "Kwanto Maru" and "Kwansai Maru"

18 Knot 10,800 Ton Cargo Motor Vessels for O.S.K's. China-Japan-New York Service

THE demand for high speed sea transportation has been realized by appearance of the cargo motor vessels *Kwanto Maru* and *Kwansai Maru* built by the Yokohama Dock Company for the Kishimoto Kisen Kaisha, Osaka.

They are the largest cargo motor vessels in Japan. The first ship, *Kwanto Maru* is now completing her first voyage and the second ship *Kwansai Maru* finished her trial on December 4, with successful results and has just started on her maiden voyage. Fig. 1, shows *Kwansai Maru* on her trial trip.

These vessels have been constructed to meet the highest requirements of Lloyd's register, and of the Board of Underwriters at New York for the transpacific service of the Osaka Shosen Kaisha between Hongkong, China, Japan, Los Angeles and New York *via* Panama with other four new motor vessels of somewhat smaller size, *Kinai Maru*, *Tokai Maru*, etc.

The principal particulars of both vessels are described as follows.:—

Length overall ...	479'-6"
,, between P.P.	460'-0"
Breadth Mld. ...	61'-6"
Depth Mld. to upper deck	39'-9"
Draught ext.... ...	28'-1¾"
Gross register ...	8,600 tons.
Dead weight... ...	10,800 ,,
Service speed ...	16 knots.
Cargo capacity ...	14,350 tons.

The vessels are notable not only for having the largest deadweight and cargo capacity, but also for the highest speed for this trade.

HULL.—The vessels are of the intermediate between two basic types of Lloyd's with two continuous decks and a third deck extending from stem to No. 5 hold as shown on plan.

They are constructed under the supervision of the Japanese Government and Lloyd's Register. The double bottom tanks are utilized for the carriage of oil fuel and water ballast, except in way of main engine seating, where lubricating oil and feed water tanks are fitted. Capacities of fuel oil tanks, and fresh water tanks, etc., are to be provided ample enough for round voyage.

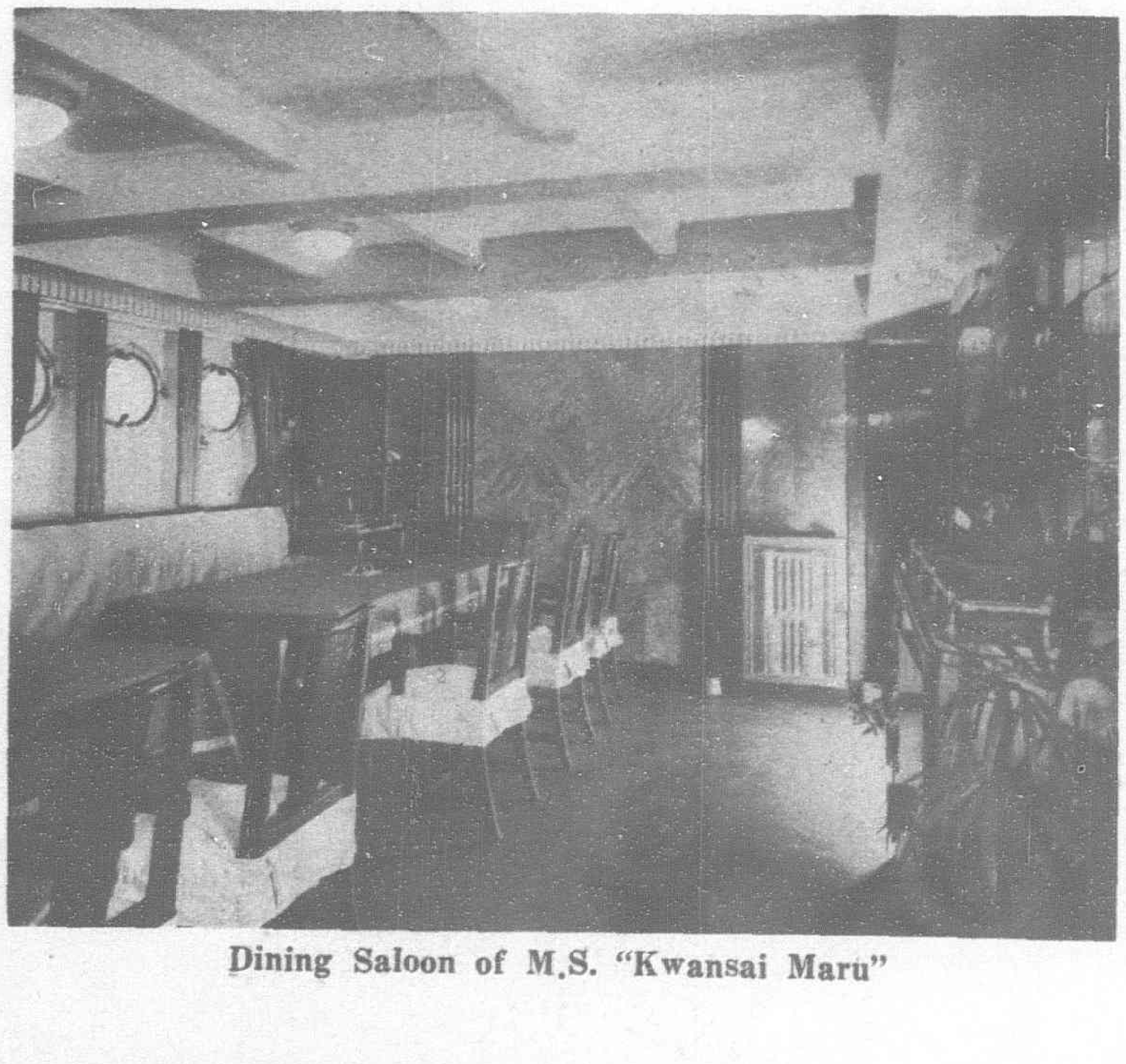
On deck are 19 Laurance Scott type electric winches, 14 of 3 ton capacity and 4 of 5 ton capacity for cargo handling, and one of 5 ton winches for mooring, all arranged as per plan Fig. 5.

The steering gear and telemotor installation is of Brown Brother's electric hydraulic type, the stock dia. of 13¾ inch and power of motor 35 h.p.

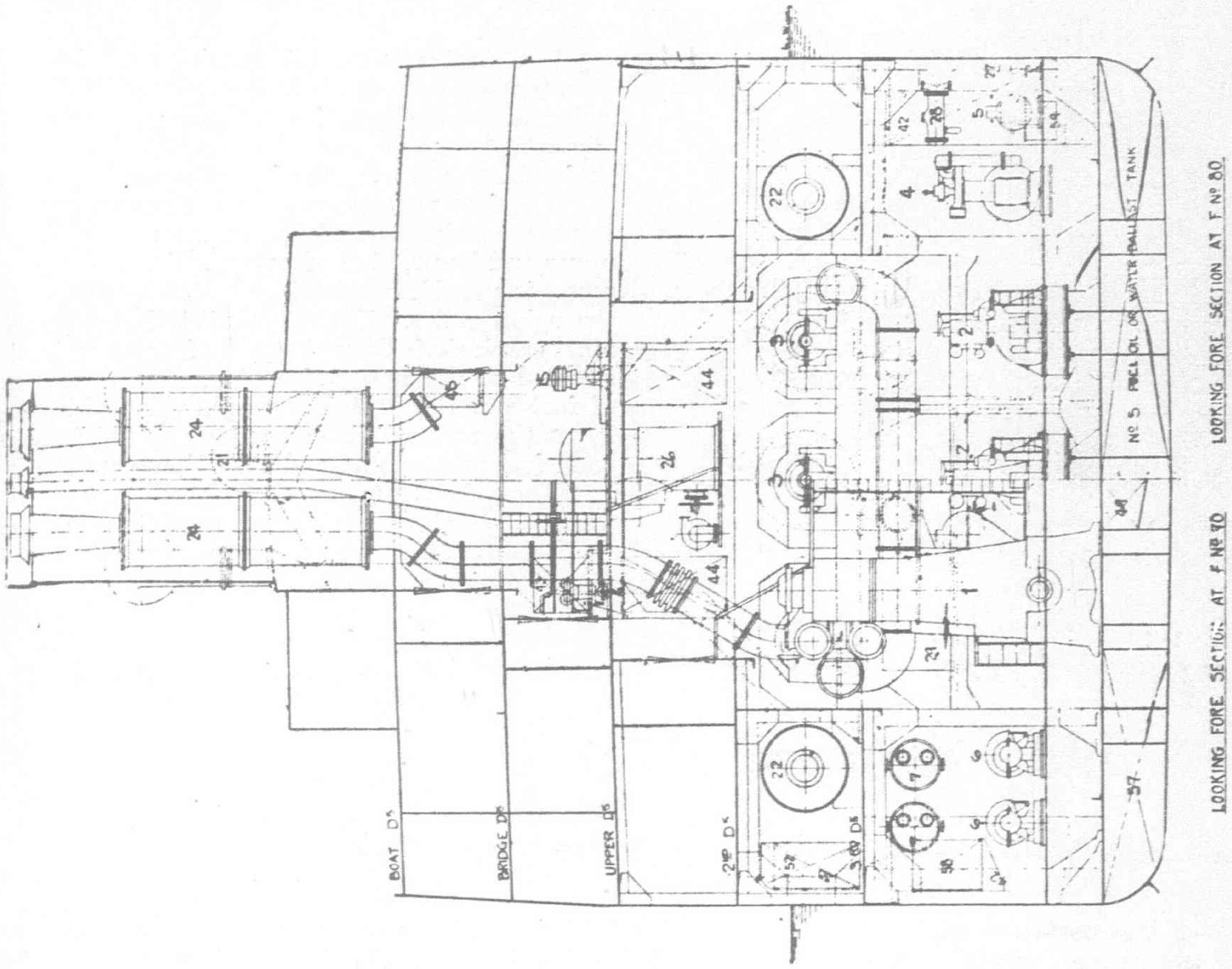
PROPELLING MACHINERY.—Main propelling machinery of each vessel are consisted of two M.A.N. double acting two cycle, airless injection Diesel engines, constructed at Augsburg Works of the M.A.N., each six-cylinder unit designed to develop 3,750 b.h.p. at 130 r.p.m. and having cylinders 600 mm. bore with a piston stroke 900 mm. These dimensions are exactly same with those of the world's largest airless injection Diesel engines as stationary installed at Henningdorf Power Station, but this was the first engine as airless injection of this type.

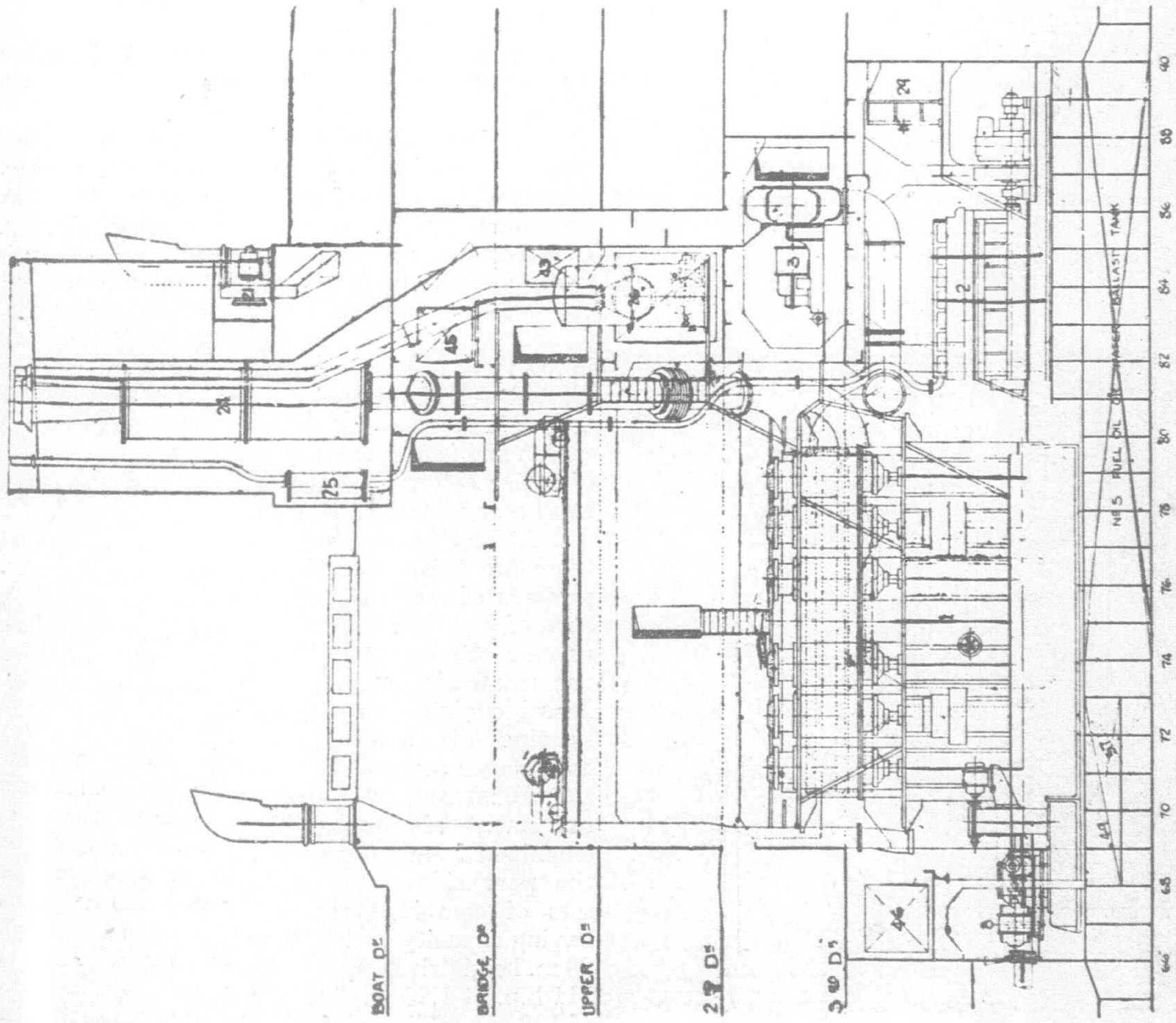
The fuel consumption was about 163 grs. per b.h.p. per hr. measured at the consumption trial as described later excluding the scavenge turbo-blower and any other auxiliary machinery and that is well under the contracted value 168 grs. per b.h.p. per hour.

The engine has very simple construction with compactness and smaller weight, about 55.5 kgs. per b.h.p., compared with air injection engine and other type of Diesel engine without having any complex moving parts at the cylinder heads as shown in Fig. 3. and also was constructed conveniently for overhauling the various parts of



Dining Saloon of M.S. "Kwansai Maru"


LOOKING FORE SECTION AT F No 80
LOOKING FORE SECTION AT F No 70
No 5 FUEL OIL OR WATER BALLAST TANK
BOAT Dk
BRIDGE Dk
UPPER Dk
2nd Dk
3rd Dk
24
21
45
44
26
22
4
42
28
2
1
57
58
24



M.S. "Kwansai Maru"

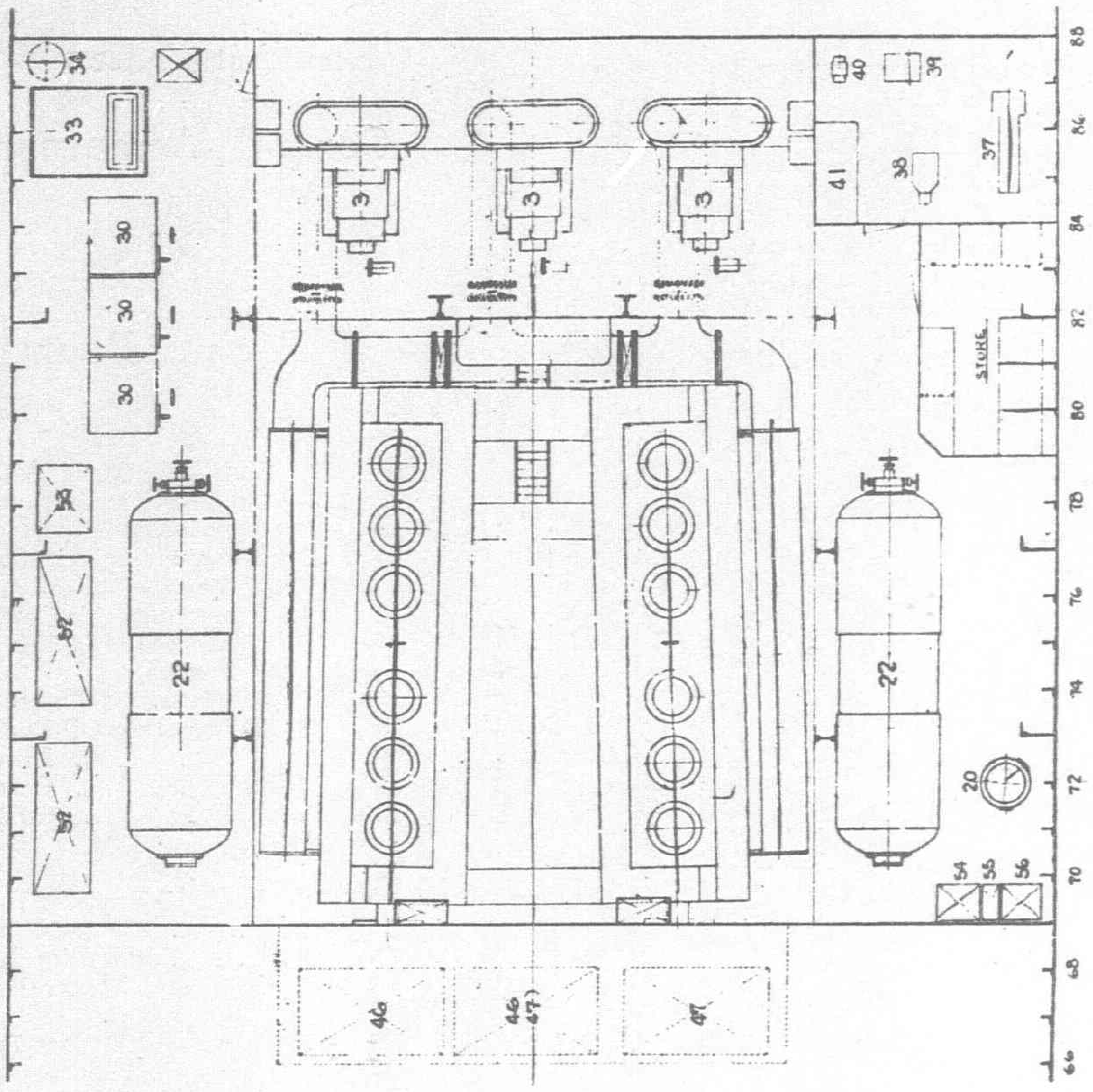
Kishimoto Kisen K.K.

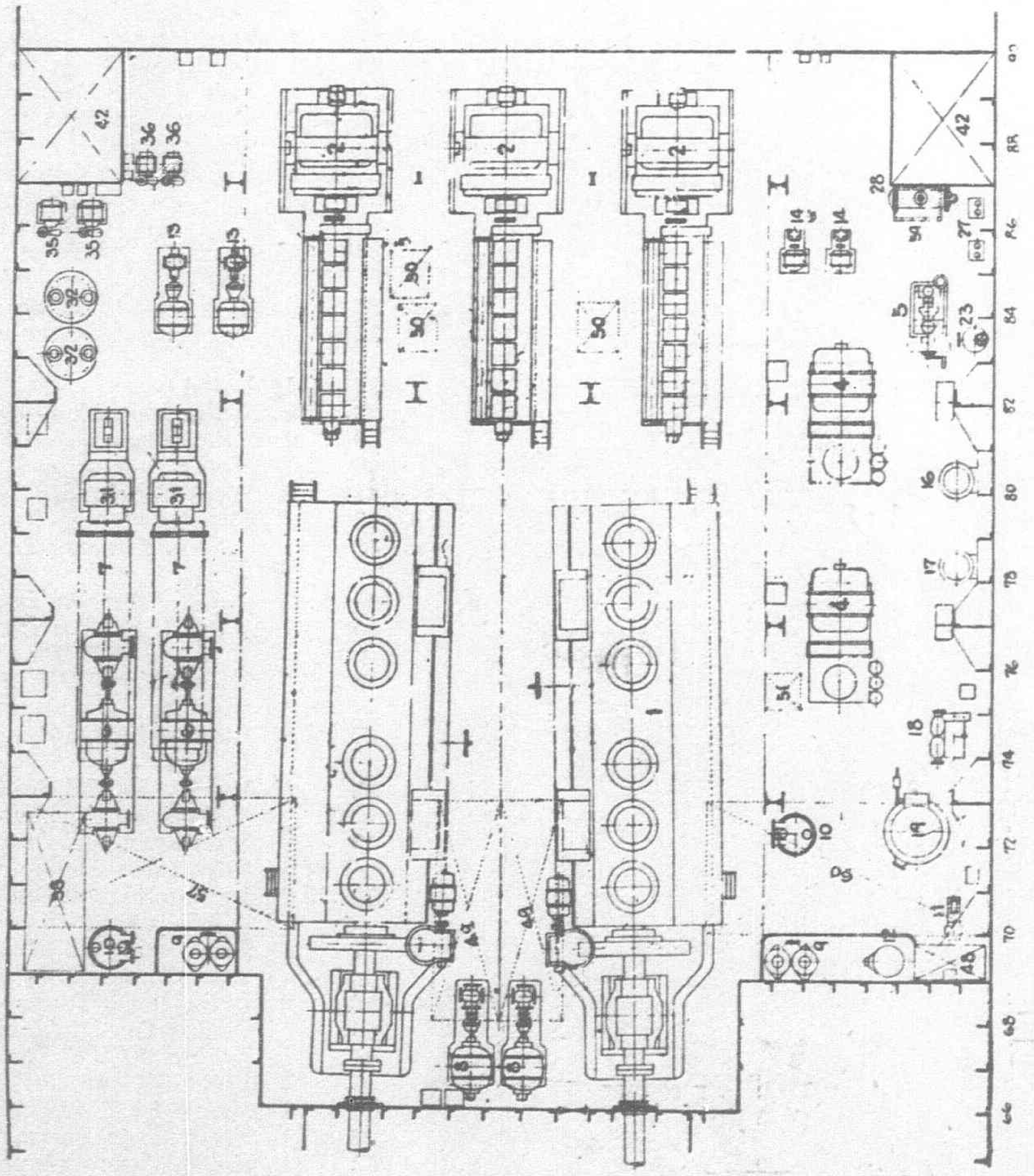
General Arrangement

of

Engine Room

Mark	*Set*	*Description*
1	2	Main Diesel Engines
2	3	Diesel Generators
3	3	Scavenging Blowers
4	2	Manœuvring Air Compressors
5	1	Emergency Air Compressor
6	2	Combined Cooling Water Pumps
7	2	Fresh Water Re-coolers
8	2	Lubricating Oil Pumps
9	2	,, ,, Filters
10	2	,, ,, Coolers
11	1	,, ,, Shifting Pump
12	1	,, ,, Purifier
13	2	Fuel Oil Transfer Pumps
14	2	,, ,, Service Pumps
15	2	,, ,, Purifiers
16	1	Fire and General Service Pump
17	1	Bilge and Ballast Pump
18	1	Bilge and Sanitary Pump
19	1	Bilge Separator
20	1	Bilge Filter
21	1	Ventilating Fan Engine
22	2	Manœuvring Air Reservoirs
23	1	Auxiliary Air Reservoir
24	2	Main Engine Exhaust Silensers
25	3	Generator Exhaust Silensers
26	1	Donkey Boiler
27	2	Feed Pumps
28	1	Condenser
29	1	Main Switch Board
30	3	Staters for Scavenging Blowers
31	2	Refrigerating Compressors
32	2	,, Condensers
33	1	,, Brine Cooler
34	1	,, Brine Mixing Tank
35	2	,, Brine Pumps
36	2	,, Circulating Water Pumps
37	1	Lathe
38	1	Drilling Machine
39	1	Grind Stone
40	1	Motor
41	1	Work Bench
42	2	Fuel Oil Settling Tanks
43	1	,, ,, Settling Tank for Boiler
44	2	,, ,, Service Tanks
45	1	,, ,, Pre-heating Tank for Purifiers
46	2	Lubricating Oil Reserve Tanks
47	2	Lubricating Oil Renovating Tanks
48	1	Lubricating Oil Pre-heating Tank for Purifiers
49	2	Lubricating Oil Drain Tank for Main Engine
50	3	Lubricating Oil Drain Tank for Generators
51	1	Lubricating Oil Drain Tank for Compressors
52	2	Cylinder Oil Tanks
53	1	Compressor Oil Tank
54	1	Kerosene Oil Tank
55	1	Light Oil Tank
56	1	Machine Oil Tank
57	1	Fresh Water Reserve Tank
58	1	Fresh Water Compensation Tank
59	1	Hot Well and Filter Tank
60	1	Feed Water Tank





the engine among which the lower cylinder covers and lower cylinder liners are specially skillfully overhauled.

The engine is smooth running and virtually vibrationless and quiet in a noteworthy degree owing to the absence of practically all mechanically operated gears and valves excepting the cam shaft which is driving the fuel pumps.

The fuel pumps are gathered in two groups at manoeuvring side of the engine and for each, upper and lower, side of every cylinder, one fuel pump is provided which is operated by cam shaft through a roller. The cam shaft is driven by the main crank shaft through train of gears which is situated at the center of engine. The regulation of fuel quantity is done by spill valve which releases the pressure oil pushed out by the plunger from fuel pump at its midway of pressure stroke.

The spill valve is regulated by the manoeuvring hand wheel and also, at the case of emergency, by the governor automatically through many links protecting the engine from getting the overspeed. Fig. 4 is the manoeuvring side of the engine showing one of the fuel pump groups, cam shaft and its driving gear case, manoeuvring hand wheel and reversing cock etc.

The cooling of the engine is done reasonably and efficiently according to M.A.N.'s practice. The cylinder jackets and covers are cooled by sea water while piston and fuel nozzles are by fresh water. The fuel nozzle cooling is effectual for protecting the carbon deposits in the cylinder from accumulating at the tips of them.

The cylinder cover, upper and lower, consists with two parts *i.e.* the inner and outer parts which are strongly ribbed and between them and along the ribs, the cooling water is circulated. The inner part, of cast steel, intended chiefly to resist the high combustion oil temperature and the outer part, of cast iron, to receive the mechanical stresses due to pressure.

Manoeuvring platform for the main engines situates at the center of the engine room and between two main engines as illustrated in the engine room plan Fig. 6.

At front of main engine, there are three Diesel dynamos, each having 375 kw. at maximum speed 375 r.p.m. and 235 volts. Each dynamo is coupled to a seven cylinder M.A.N. Diesel engine, also of air-less injection and 4 cycle type, 410 b.h.p. at 375 r.p.m. having bore 275 mm. stroke 420 mm. These diesel engines are shown in Fig. 7. Scavenging air is supplied from three Brown-Boveri blowers which are located well above the Diesel generators. Each blower has capacity enough for one propelling engine and is 525 m^3 per minute at the pressure of water column 1,400 mm., max. motor power 230 h.p. at 2,000-2,750 r.p.m.

At starboard side of the engine room, there are two motor driven starting air compressors of capacity 420 m^3 free air per hour, each of one cylinder, three stage type, maximum pressure 30 kg/cm^2. For the emergency case, one small air compressor driven by the "Colo" Diesel engine is also installed. In Fig. 8 these starting air compressors and emergency air compressor are clearly shown.

Auxiliary Machinery.—The general arrangement of the auxiliary machinery can be examined from the engine room plan Fig. 6. At the port side of the engine room, there are two sets of combined sea and fresh water pumps having capacity each 450 m^3 and 150 m^3 against 28 m. head driven by a common motor of power 111 h.p. at 1,200 r.p.m., the fresh water re-cooler of 100 m^2 cooling surface, etc. For refrigerating

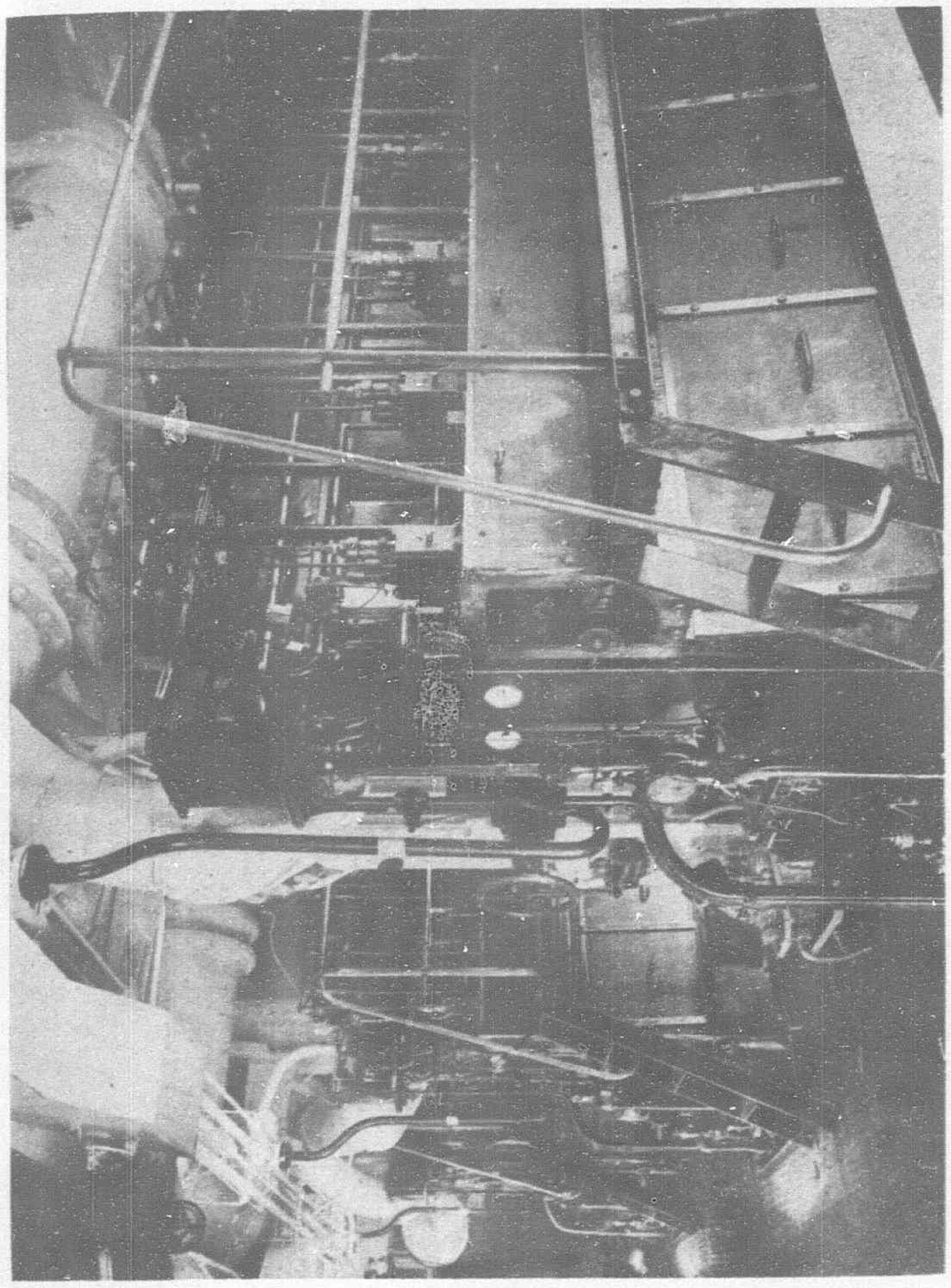
STEERING ENG ROOM
BOATN STORE
Nº 6 UPPER TW DECK CARGO SPACE
Nº 5 & 6 UPPER TW DECK CARGO SPACE
PROV STORES
Nº 3 UPPER TW DK CARGO SPACE
Nº 2 UPPER TW DK CARGO SPACE
Nº 1 UPPER TW DK CARGO SPACE
CHAIN LOCKER
BOATN STORE
Nº 5 LOWER TW DECK CARGO SPACE
Nº 4 LOWER TW DK CARGO SPACE
Nº 3 LOWER TW DK CARGO SPACE
Nº 2 LOWER TW DK CARGO SPACE
Nº 1 LOWER TW DK CARGO SPACE
AFT PEAK TANK
Nº 6 HOLD
Nº 5 HOLD
SHAFT TUNNEL
TUNNEL RECESS
ENGINE ROOM
Nº 3 HOLD
Nº 2 HOLD
Nº 1 HOLD
FORE PEAK TANK
Nº 3 FUEL OIL OR W B TANKS (P & S)
Nº 2 FUEL OIL OR W B TANKS (P & S)
Nº 1 FUEL OIL OR W B TANK
DOCKING BRIDGE
BRIDGE DECK
ENGINE OPENING
BOAT DECK
ENGINE OPENING
FLYING BRIDGE DECK
FUNNEL
FCLE DECK
UPPER DECK
Nº 6 CARGO HATCH 27-6 × 15-0
Nº 5 CARGO HATCH 33-0 × 20-0
Nº 4 CARGO HATCH 26-9 × 20-0
ENGINE OPENING
Nº 3 CARGO HATCH 30-3 × 20-0
Nº 2 CARGO HATCH 35-9 × 20-0
Nº 1 CARGO HATCH 27-0 × 18-0
CARPENTER STORE
STORE
PAINT ROOM
LAMP ROOM

General Arrangement of the Hull of the M.S. "Kwansai Maru" and "Kwanto Maru" Built and Engined by the Yokohama Dock Co., Ltd.

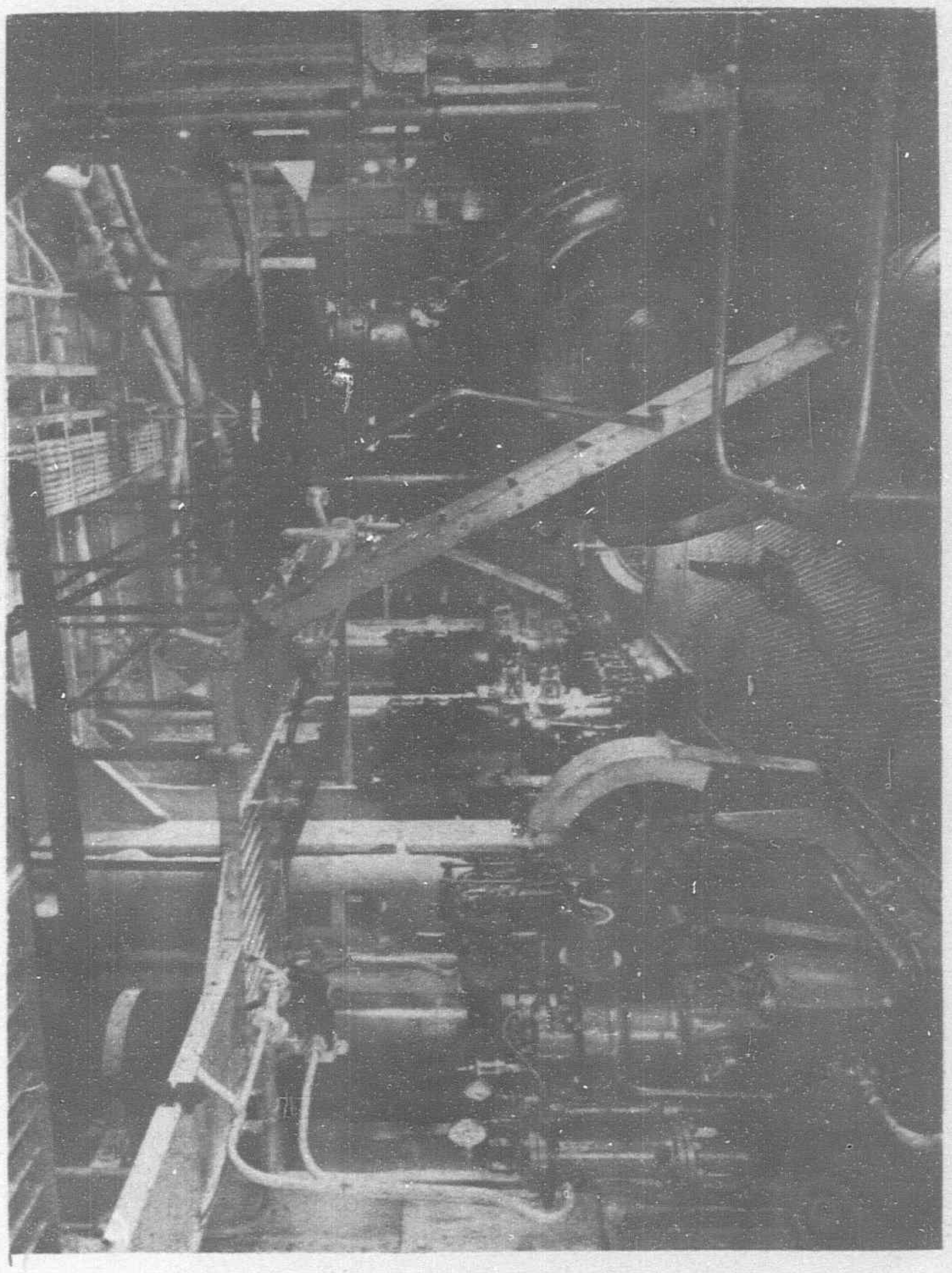
2ND DECK
SPECIAL CARGO ROOM
SILK ROOM
Nº 6 UPPER
Nº 6 CARGO HATCH
27-6 × 18-0
CARGO SPACE
Nº 5 CARGO HATCH
33-0 × 20-0
Nº 4 & 5 UPPER TWEEN DECK
Nº 4 CARGO HATCH
24-9 × 23-0
CARGO SPACE
SILK ROOM
FRESH WATER TANK
WET PROV STORE
VEGETABLE
BOND STORE
FISH & MEAT
ENGINE OPENING
STORE
RICE STORE
DRY PROV STORE
F.W.T
FROZEN CARGO
FROZEN CARGO
FROZEN CARGO
Nº 3 UPPER TWEEN DK
Nº 3 CARGO HATCH
30-3 × 20-0
CARGO SPACE
SILK ROOM
Nº 2 UPPER TWEEN DECK
Nº 2 CARGO HATCH
35-9 × 20-0
CARGO SPACE
SILK ROOM
Nº 1 UPPER TW DECK
Nº 1 CARGO HATCH
27-0 × 18-0
CARGO SPACE
CHAIN LOCKER
DO
STORE

3RD DECK
BOATN STORE
Nº 6 HOLD
WING TANK COMMON TO Nº 6 FUEL OIL TANK
Nº 5 LOWER TWEEN DK.
SHAFT TUNNEL
Nº 5 CARGO HATCH
33-0 × 20-0
DO
CARGO SPACE
DO
Nº 4 LOWER TW DK
CARGO OIL TANK (UNDER)
O.T. HATCH
O.T. HATCH
CENTRE TANK Nº 5 F.O.
COMMON TANK
DO
DO
DO CARGO SPACE
DO
ENGINE ROOM
Nº 3 LOWER TWEEN DECK
Nº 3 CARGO HATCH
30-3 × 20-0
CARGO SPACE.
Nº 2 LOWER TWEEN DECK
Nº 2 CARGO HATCH
35-9 × 20-0
CARGO SPACE
Nº1 LOWER TWEEN DECK
Nº 1 CARGO HATCH
27-0 × 18-0
CARGO SPACE
CHAIN LOCKER
DO
BOATN STORE

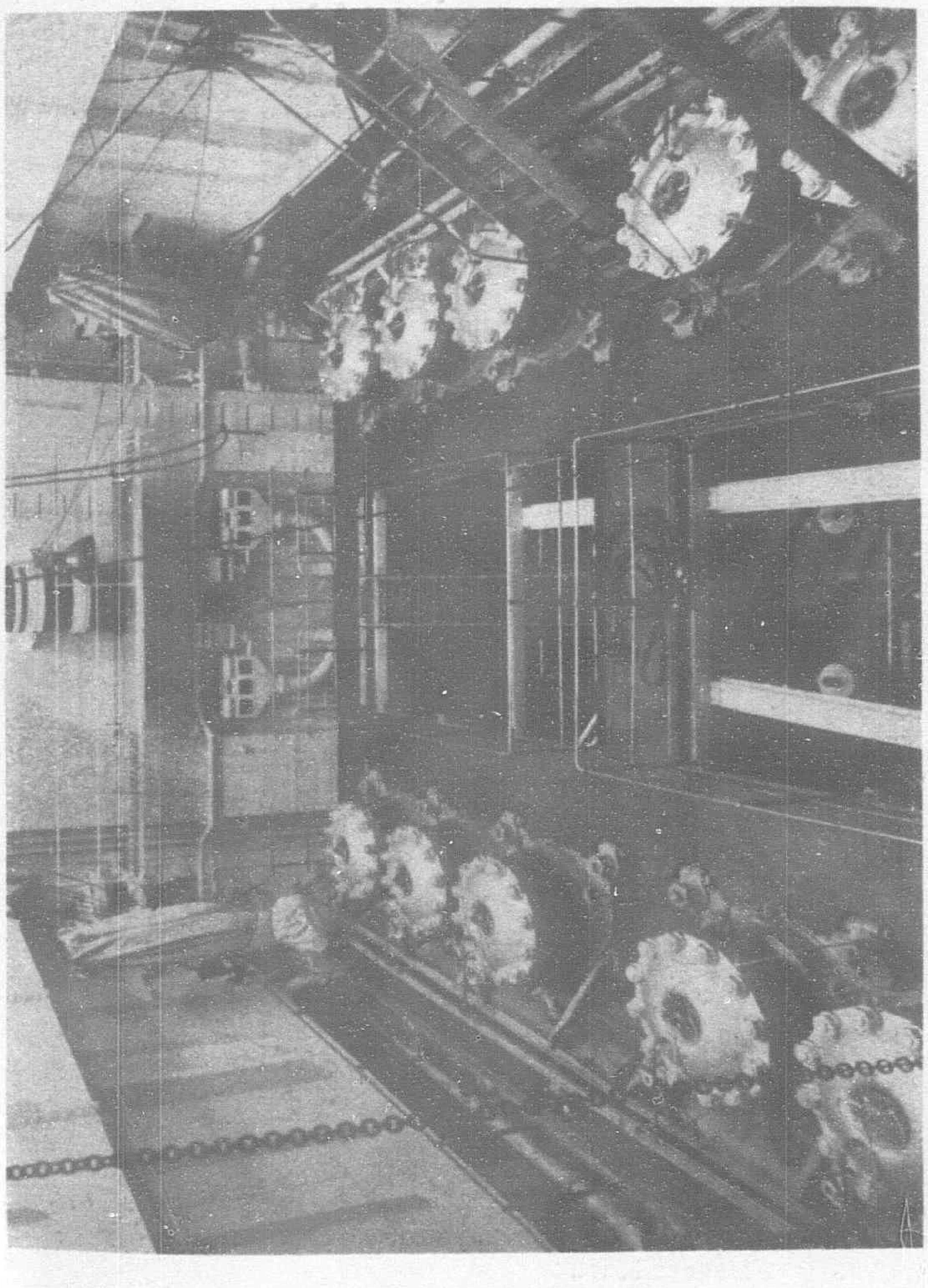
ENGINE ROOM OF M.S. "KWANSAI MARU"



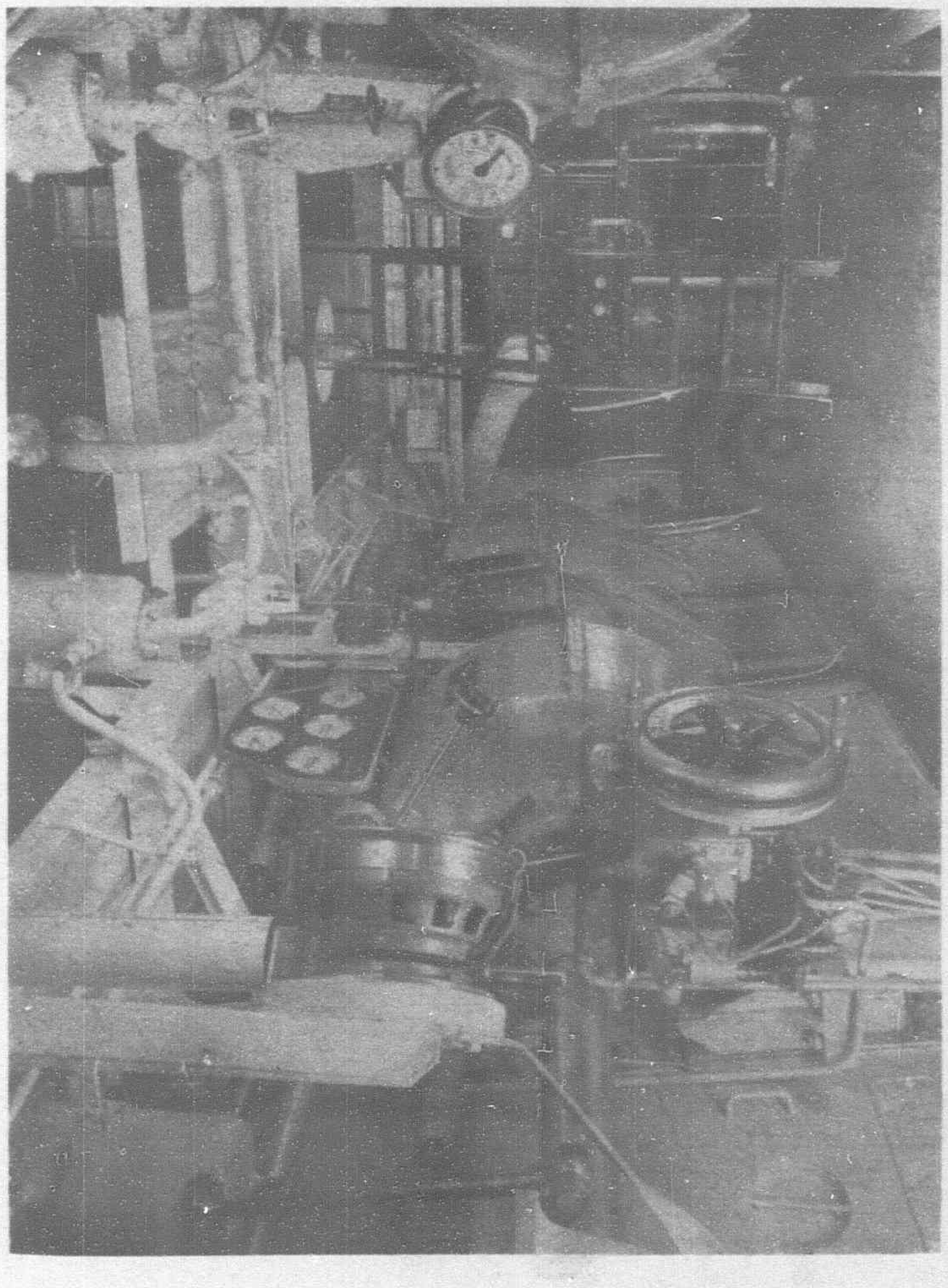
Manoeuvering Side of 3 M.A.N. Diesel Engines for Dynamo



Starboard Side of Engine Room. Showing Starting Air Compressor, Emergency Air Compressor and other Ship's Pumps



View of Top of Main Engines



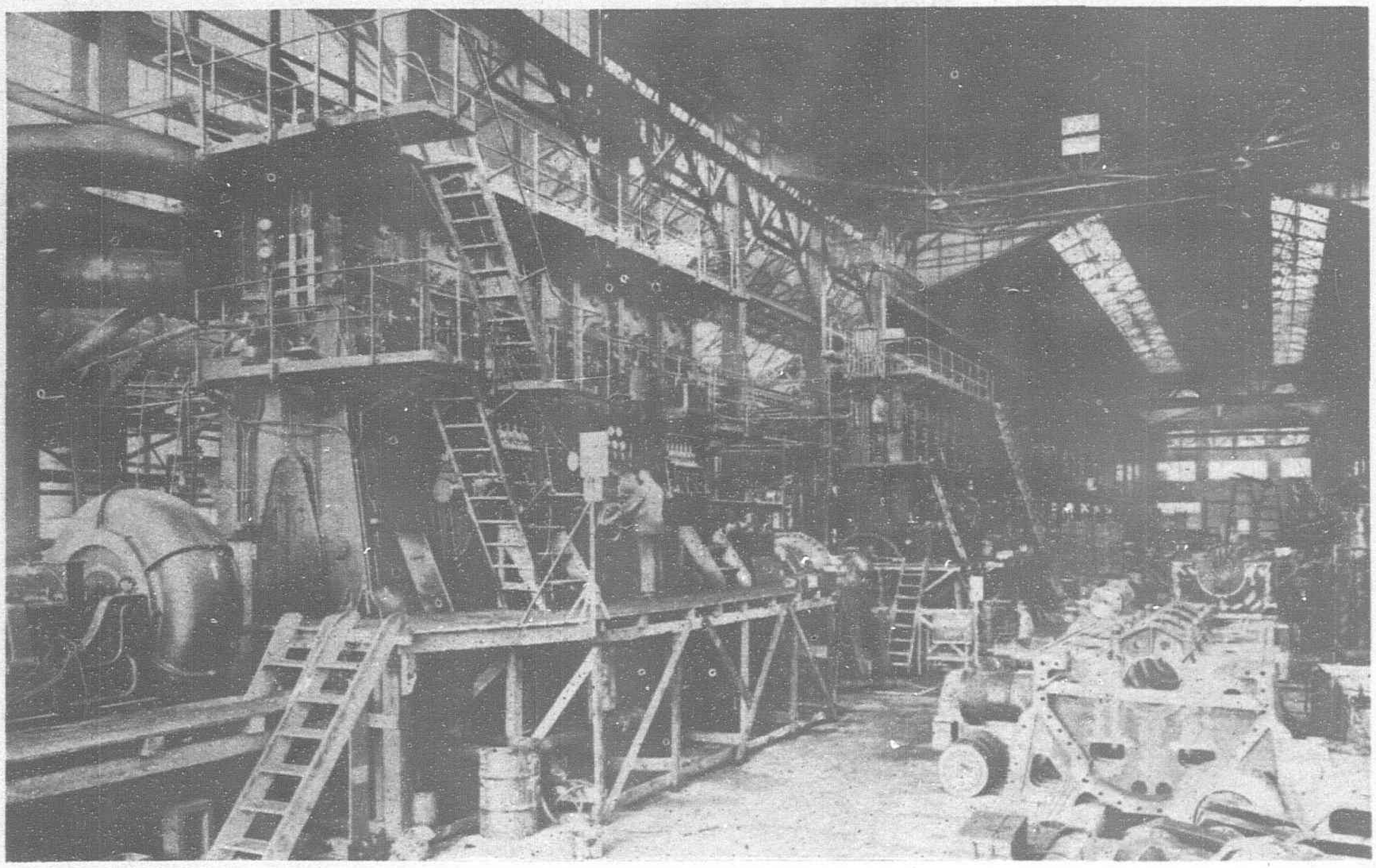
Manoeuvering Side of Engine, Showing one of the Fuel Pump Groups, Cam Shaft and its Driving Gear Case, Manoeuvering Hand Wheel and Reversing Cock, etc.

cargo and provision cooling, two sets of CO_2 Refrigerating machinery made by Sabroe, Denmark, are installed at the port side of the engine room. Refrigerating machinery consists of two CO_2 compressors, each capacity of 12,600 cal. per hour, two condensers, two evaporators, two cooling water pumps, two brine pumps.

Two lubricating oil pumps are installed between shaft aft of engine room. One oil cooler are at each side of the engine room.

One lubricating oil shifting pump, two sets of fuel oil transfer pumps, two sets of fuel oil service pumps, one De Laval purifier for lubricating oil, and one oily water seprator of Turbulo type are installed at the starboard side of the engine room.

On the level above the turbo blowers, one oil fired donkey boiler, as shown in Fig. 9, designed and built by the Yokohama Dock Company is installed. This has diameter of 1.4 m. and height of 3.45 m. and for working pressure of 7 kgs. per sq. cm.

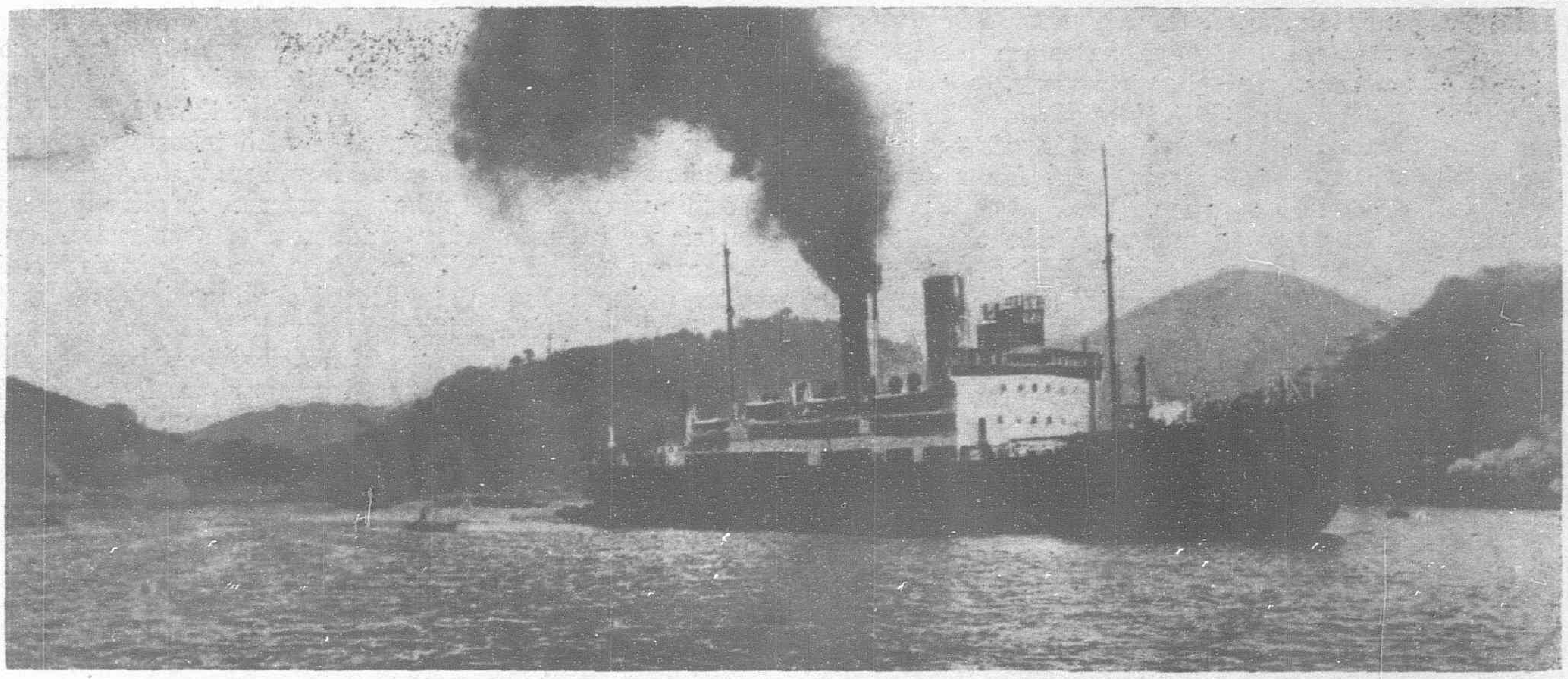


Main Engine of the M.S. "Kwansai Maru" in the Testing Shop of the Yokohama Dock Company

The main engines and their appurtenant auxiliary machinery for *Kwanto Maru* are supplied after completely tested at Augsburg Works, while the main engines for *Kwansai Maru* are erected and tested at the shop of Yokohama Dock Company who is the manufacturing licensee of the M.A.N. Diesel engines in Japan. Fig. 10 shows one of the main engine of *Kwansai Maru* at the testing shop of the Yokohama Dock Company.

Official trials of *Kwansai Maru* have been successfully carried out with best results at the Entrance of Tokyo bay at the beginning of December and got the highest record of speed 18.792 knots developing power 9,468 b.h.p. at 146 r.p.m. The fuel oil consumption was measured and Specific fuel oil consumption for main engines at 6,895 b.h.p. and 128 r.p.m. was 163 gr. per b.h.p. per hour excluding turbo blowers.

Upper Front of Engine Room of M.S. "Kwansai Maru"



The "Aniwa Maru," Imperial Japanese Railway Ferry Boat Connecting Hokkaido with Saghalien

Japanese Government Railway Car Ferry Between Aomori and Hakodate

One of the most interesting papers submitted to the World Power Conference held at Tokyo last year dealt with the economic results of the operation of the car ferry between Aomori and Hakodate, connecting the Japanese Government rail system in the main island with the lines in Hokkaido. The paper described with great detail the effect on shipping expense and other charges, as well as a description of the plant and equipment. The adoption of a train ferry across the Yangtze, to connect the Shanghai-Nanking and the Tientsin-Pukow railway creates interest in the only other similar installation in the Far East.

There are now five car ferries in service, between Aomori and Hakodate namely, *Shoho Maru*, *Hiran Maru*, *Tsugaru Maru*, *Matsumae Maru* and *Seikan Maru No. 1*. Four of them can carry passengers on board as well as the goods cars and are all of the same dimension, The first two were built by Uraga Dock Co., Ltd., in 1924 and the latter two built by Nagasaki Works, Mitsubishi Zosen Kaisha, Ltd. in 1924. *Seikan Maru No. 1* is of different design and can carry goods cars only. She was built by Yokohama Dock Co., Ltd., in 1926.

The following are the particulars of the *Shoho Maru* and her sister ships.

Length overall	360′ 0″
Length P.P.	350′ 0″
Breadth molded	52′ 0″
Depth molded to wagon deck	22′ 0″
Load draught	15′ 0″
Corresponding displacement, tons ...	4,525
Dead weight, tons	965
Gross tonnage	3,465
Net tonnage	1,270
Shaft horsepower...	5,730
Speed trial, knots	16.96
Service speed, knots	13
Number of passengers :	
First class	39
Second class	208
Third class	648
Total	895
Officers, engineers and crew	100
Total complement	995
Number of cars :	
15-tons goods cars	22
Mail van	1
Baggage van	1
15-ton goods cars	25

The general arrangement of the *Shoho Maru* and her class is shown by the plans reproduced on Plate 1. From these it will be seen that the stem is straight, raking slightly forward, while the stern is of the cruiser type of special design to comply with the rails from transfer bridge. The rudder is of semi-balanced type at the stern and special type at the bow. The bow rudder is fitted for maneuvering the ship when she enters the port astern.

There are in all five decks, designated respectively from above, the boat deck, upper promenade deck, lower promenade deck, wagon deck, and main deck. The deck which is carried continuously throughout the length of the vessel is the wagon deck only, while the lower promenade deck consists of two narrow galleries at both sides of ship, except for a short part forward.

The cellular double bottom extends fore and aft between forepeak bulkhead and the aft-peak bulkhead and is available for the storage of boiler feed water, fresh water and water ballast. The wing tanks are at both sides of the ship, each having a capacity of about 100 tons. Each wing tank is fitted with pneumacator tank gauges and has connection with a powerful centrifugal pump of 18 inches bore in diameter. These wing tanks are fitted for the purpose of preventing the ship from heeling while the cars are loaded on one side track. In connection with the arrangement of pipes it is interesting to notice that the water can be filled to whichever side of tank intended and also can be shifted from one side of tank to other. These are done by electric controller at aft navigation bridge, from where the officer in charge can see the cars while they are loaded or unloaded to or from the ship. In the navigation bridge there is a clinometer to show the inclination of ship and pneumacator tank gauge to know the amount of water in both wing tanks.

The vessel is divided by six watertight transverse bulkheads extending to wagon deck. The main deck abaft the engine room forms the watertight flat to dispense with the shaft tunnels.

Turning now to the deck arrangements, the lowest deck is the above-mentioned main deck. This deck is confined to the ends of the vessel, extending from the stern to the after bulkhead of the engine room, and from the fore bulkhead of the boiler room to the stem. The large portion of this deck is devoted to third-class accommodations and forward of this deck to boys and cooks rooms and afterward to mail and baggage rooms. The third-class accommodations are all in single bunks and laid with "tatami" (special Japanese matting) and well lighted, heated, and ventilated. Special care was taken for ventilating the rooms, electrically driven exhaust fans being installed for that purpose.

The wagon deck is devoted to storing goods cars, except the port side being provided for third class lavatories and the foremost position for firemen's quarters. This deck is covered with asphalt throughout the car space, and strong eye plates are fitted at both sides of each rail for fastening cars when necessary.

The lower promenade deck on both sides of car space is of two narrow galleries; the port side is devoted to third class promenade deck and the starboard side to engineers. The foremost portion of this deck serves as seamen's quarters.

Coming now to the upper promenade deck, the aftermost portion is devoted to second class accommodation. There is a very large airy room, all laid with "tatami" (Japanese matting) and covered with carpet, while the passages are covered with linoleum. Proceeding forward, accommodations are arranged for second class sleeping rooms where berths are provided for 28 passengers; the second class smoking room is on the port side and lavatories and purser's room on the starboard side. Forward of this is the dining saloon for first and second class passengers, in which twenty-eight persons may be accommodated at small tables. The dining saloon is the most magnificent room of the vessel, and is surmounted by a dome skylight, under which is stained glass of artistic design. The walls are panelled in lacquered oak of light color. Large rectangular windows enhance the decorations. The ceiling is panelled in soft wood of white finish, and tasteful pieces of silver ware complete the appointments of the room. Further forward still is the first class smoking room. The walls are attractively panelled in oak, and the ceiling is white finish with oak-beams, having a stained glass skylight in the center. The floor covering is cleverly designed rubber tile, and contributes to the feeling of coziness. The room is lit by windows at the side and is cozily furnished with fixed leather-covered seats, and the sturdy furniture, chairs and tables, give a feeling of comfort. At one side of this room is a neatly-designed fireplace having an electric heater and marble mantelpiece. The foremost portion of this deck is devoted to first-class state rooms. Each room is panelled in soft wood, painted white, and is furnished with fine wooden beds and tables in polished wood. Each room accommodates five passengers. The beds of these state rooms are of special design and each bed can easily be changed to a sofa, and so the room can be changed to sofas only, or sofa and beds, when required.

The boat deck is mainly devoted to stowing life boats. The eight life boats and one tenma, (Japanese type boat) are arranged with Welin's quadrant davits and electric boat winches for lifting the boat. At the after-end of this deck there is the aft navigation bridge, fitted with steering wheel with telemotor connecting with both bow and stern rudders and from here the captain can maneuver the ship when she enters the port astern. As already mentioned the electric controller for wing tank and pneumacator tank and draught gauges are fitted in this bridge. The fore end of this deck is devoted to the accommodation of officers including wireless operators.

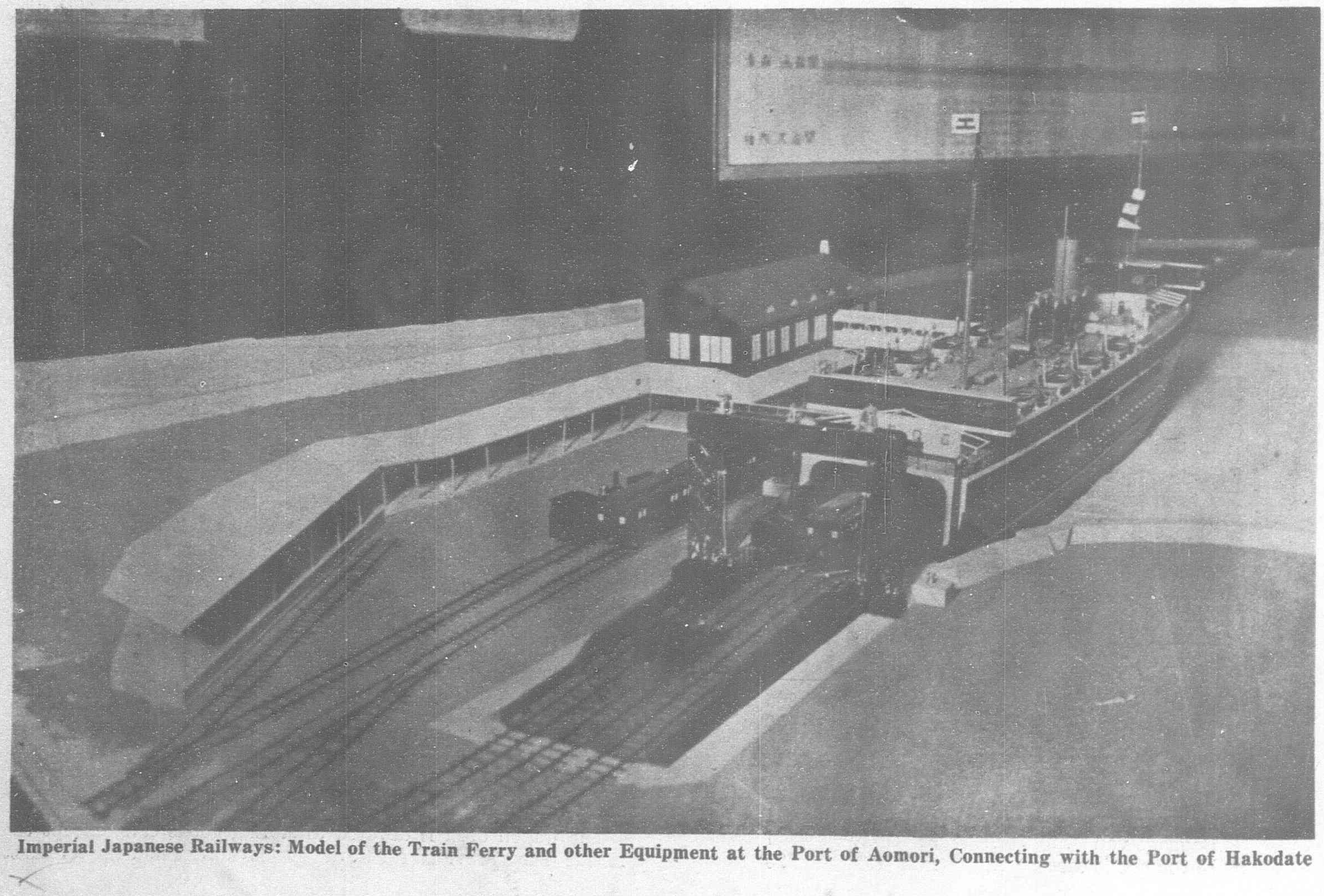
The navigation bridge is above the officer's accommodations fitted with steering wheel with telemotor, both Sperry's gyro-compass and Kelvin's dry card compass are installed. The gyro-compass is fitted to avoid the probable error which may occur by loading cars on board. Engine telegraph, docking telegraph, loud voice telephone, engine revolution indicator, chart tables and other navigation instruments are completely fitted in this bridge.

A Kelvin's dry card standard compass is installed in the compass platform and Sperry's 18 inch high intensity searchlight is fitted at the fore mast to light the berth.

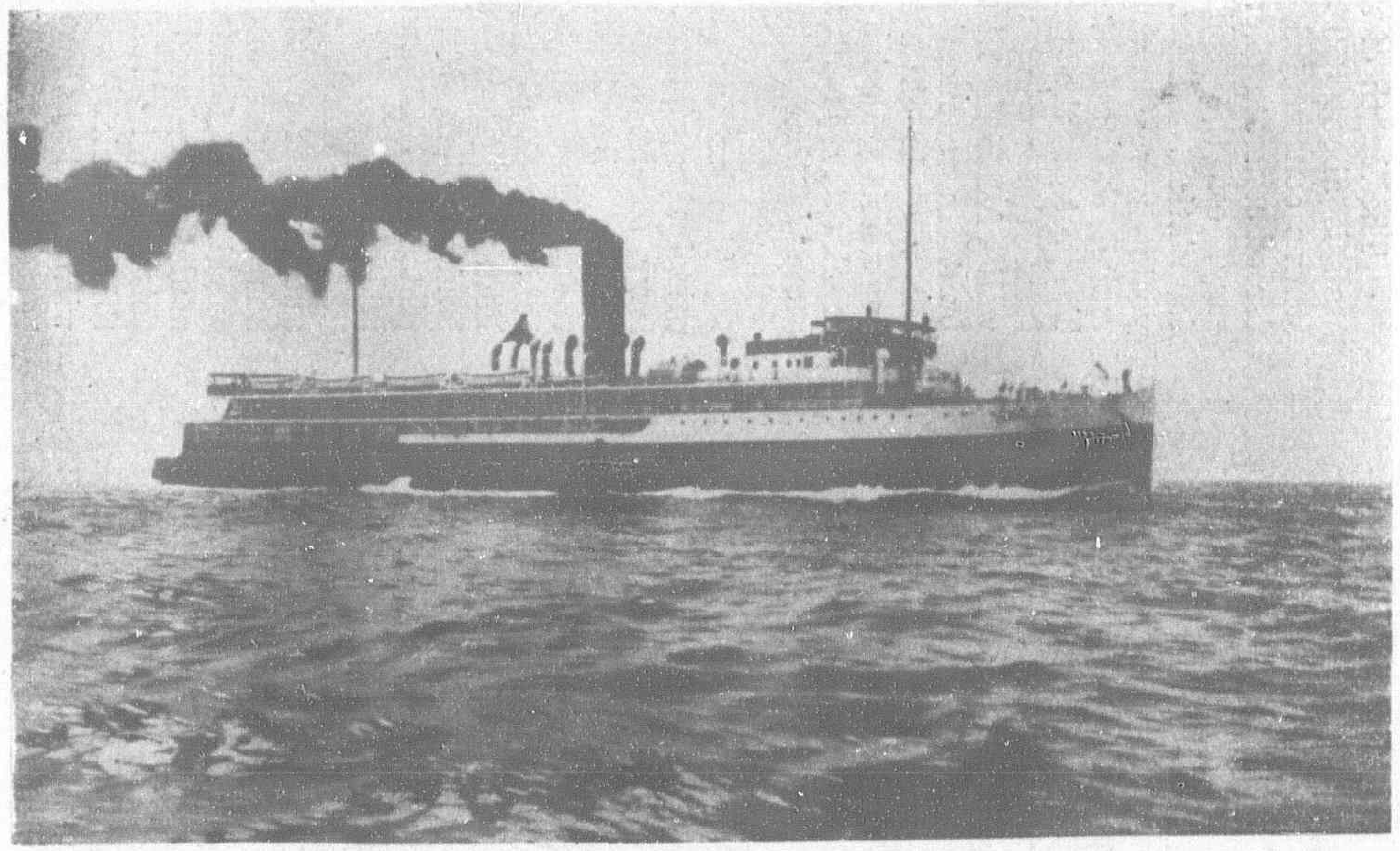
The ship is thoroughly lighted by electric light and heated by steam heat for the comfort of passengers and crew.

The particulars of *s.s. Seikan Maru No. 1* are as follows:

Length overall	366′ 0″
Length P.P.	366′ 0″
Breadth molded	52′ 0″
Depth molded	20′ 0″
Load draught	13′ 0″
Corresponding displacement, tons ...	3,352
Dead weight, tons	1,008
Gross tonnage	2,326
Net tonnage	762
Shaft horsepower...	2,300
Speed trial, knots	13.5
Number of passengers third class ...	12
Officers, engineers and crew	55
Total complement	67
Number of cars 15-ton goods cars ...	43

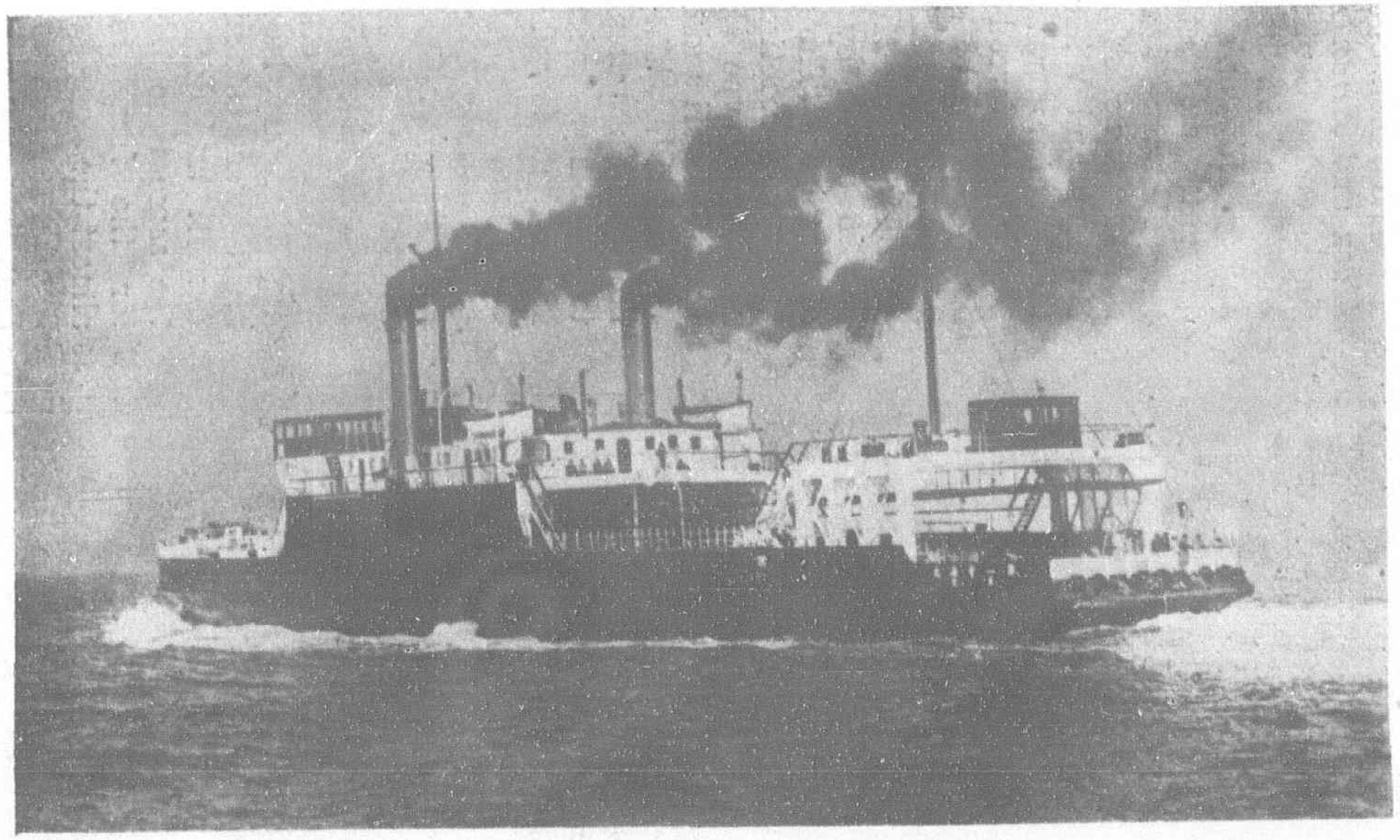


Imperial Japanese Railways: Model of the Train Ferry and other Equipment at the Port of Aomori, Connecting with the Port of Hakodate



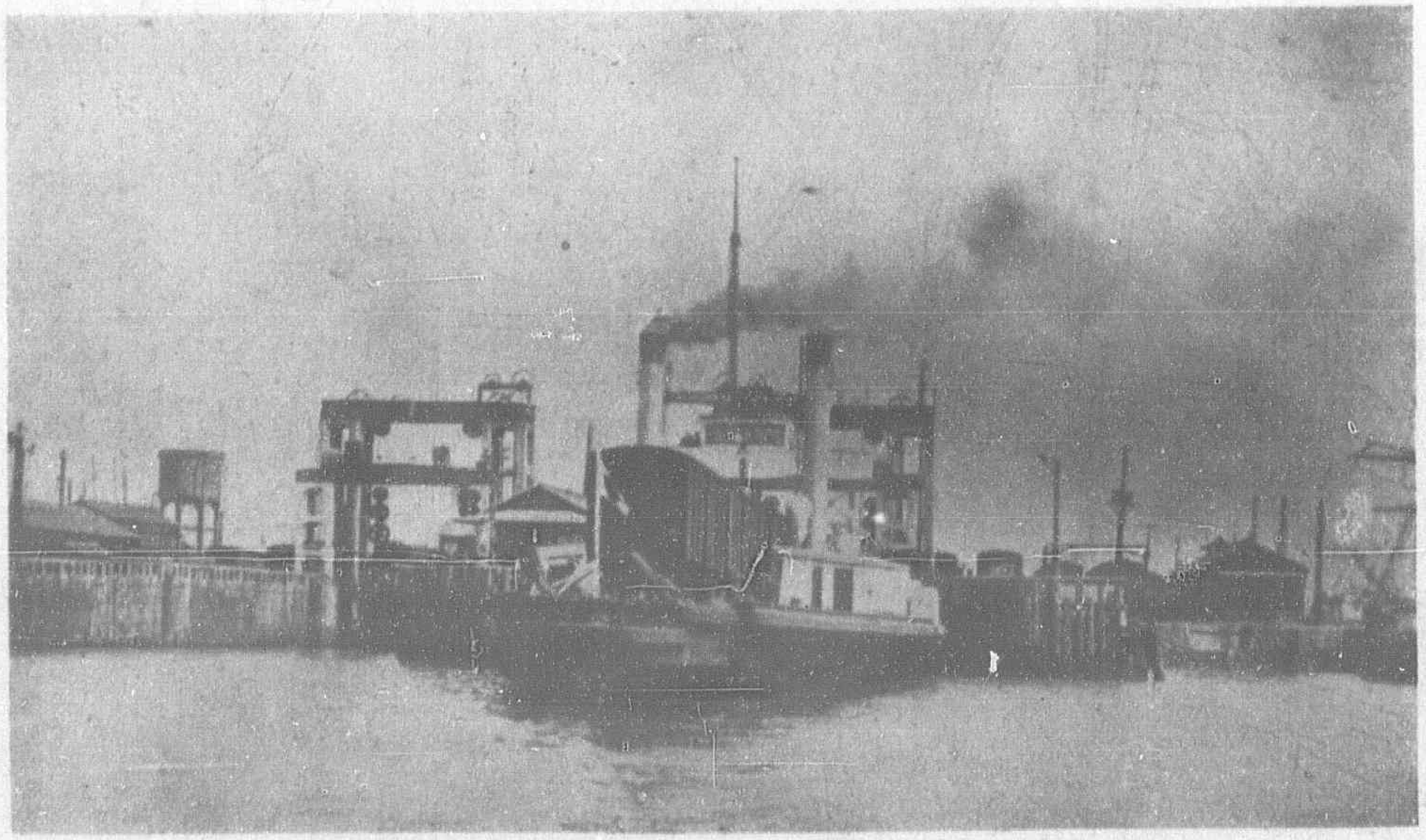
The Car Ferry S.S. "Tsugaru Maru"

1



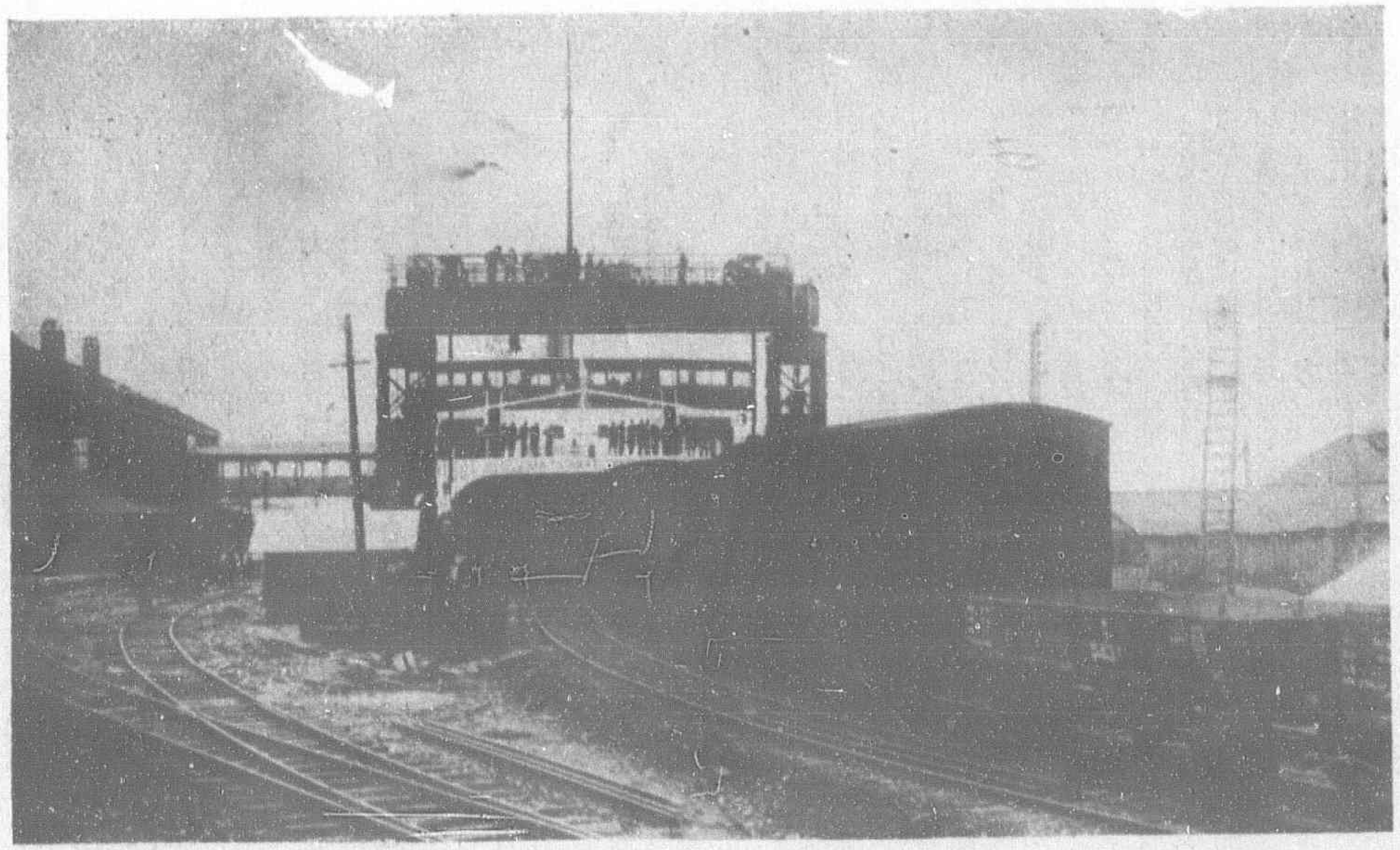
The Car Ferry S.S. "Seikan Maru No. 1"

2



S.S. "Matsumae Maru"

3



Ferry Slip at Aomori

4

The general arrangement of *Seikan Maru No. 1* is shown in the plans reproduced on Plate II. The stem and stern of this ship are nearly equal to those of *Shoho Maru* and her class, and the same berths are used. This ship was designed particularly for carrying goods cars ; the deck area is very large compared with *Shoho Maru*, and her length is slightly longer than the latter. Her wagon deck can accommodate 43 goods cars on four tracks.

Crew space is provided on the main deck, and officers, engineers and pursers accommodations are on the promenade deck.

Arrangement of fore and aft navigation bridge is just like that of the *Shoho Maru*, and the wing tanks of adequate capacity are fitted and can be controlled from the aft navigation bridge.

Engine Parts

The main propelling machinery of the *Shoho Maru* and her three sister boats, are two sets of turbines coupled through single reduction gear to the twin prope'ler shafts.

The turbines of the *Shoho Maru* and *Hiran Maru* are of Rateau's patent impulse type and were built by the Metropolitan Vickers Electrical Co., Ltd., England, and those of the *Tsugaru Maru* and *Matsumae Maru* are all of impulse type, specially designed and built by the Nagasaki Works, Mitsubishi Zosen Kaisha, Ltd.

The boilers of the *Shoho Maru* and *Hiran Maru* are single ended Scotch boilers with Schmidt's super heater and Howden's forced draught, and those of the *Tsugaru Maru* and *Matsumae Maru* are Babcock and Wilcox water tube boilers with super heater and forced draught of the closed stokehole system.

The *Seikan Maru No. 1* is also driven by two sets of turbines. The turbines are impulse reaction, double reduction type built by Brown-Boveri and Co., Ltd., Switzerland. The boilers are Ikeda's patent water tube boiler with super heater and forced draught of the closed ashpit system.

The details of other auxiliary machinery and generators are shown in annexed Tables.

EQUIPMENT ON LAND.—The necessary land equipment was established at Aomori and Hakodate at the same time ; the design for the ferry service is almost the same.

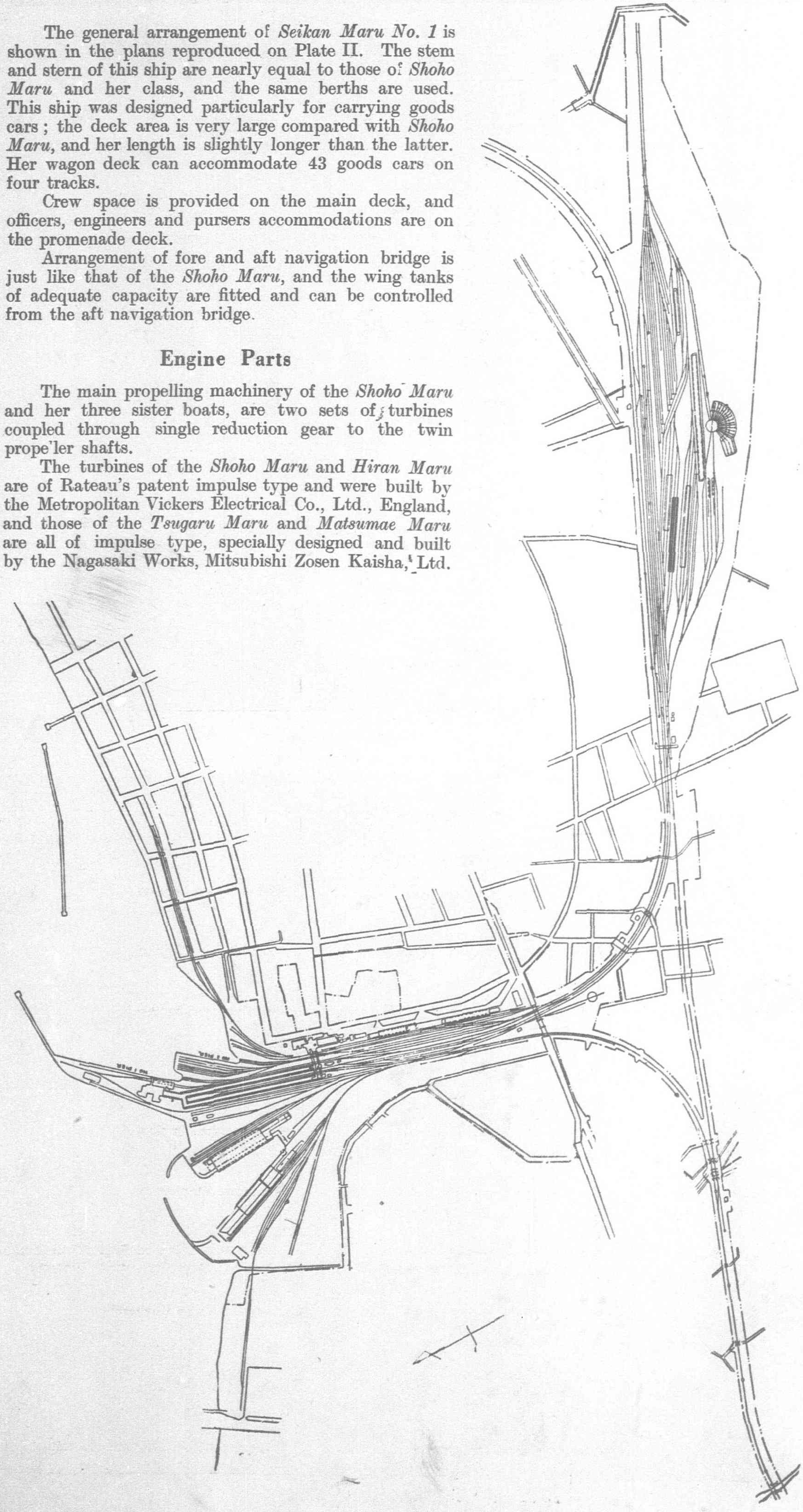
EQUIPMENT AT AOMORI STATION.—The principal equipment built on the Aomori side is as follows :

1. Landing pier
2. Transfer bridge

The length of the quay wall is about 850 ft. and it was constructed of reinforced concrete where necessary, on the solid block foundation. Eleven iron posts were arranged to make the safe mooring. To protect the port yard from the raging water, a wall of 265 feet long, was built in connection with the west breakwater. The engineering design of the breakwater is almost the same as that of the quay wall.

The landing pier is the principal equipment in the ferry service and its connection with the tracks in the station compound is shown in a plan (refer to Plan I). (There are two landing piers, No. 1 completed in 1925 and No. 2 in 1928).

The construction of quay wal for ship's stern has no example in the world. The foundation was made of reinforced concrete caissons (of 15-ft. 6-in. thick), which were filled with sand ballast except bottom and middle part where concrete was applied.



Plan, 1.—General Plan of Aomori Car Ferry Compound and its Marshalling Yard in 1927

		Shoho Maru *Hiran Maru*	*Tsugaru Maru* *Matsumae Maru*	*Seikan Maru No. 1*
Main Engine	Set Type Maker S.H.P. 5,730 Lub. Sys. Gravity	2 H.P. 2 L.P. M.V. Rateau Impul. Single Reduction Turbine Metropolitan, Vickers, England	2 H.P. 2 L.P. N.M.B. All Impul. Single Reduction Turbine. Mitsubishi, Nagasaki	2. B.B.C. Impulse React. Double Reduction Turbine. Brown-Boveri, Switzerland, 2,300
Main Boiler	Set Type	6. Single End Marine Scotch Boiler Super Heater Total Heat. Surf. 14,086 sq. ft. Total Grate Area 364. sq. ft. Total Sup'h. Surf. 3,990. sq. ft. Working Pressure 200 lbs./– sq. in. 120°F. Superheat	6. B. & W. Water Tube Boiler with Superheater Total Heat. Surf. 10,920 sq. ft. Total Grate Area 346.5 sq. ft. Total Sup'h. Surf. 2,064. sq. ft. Working Pressure 200 lbs./– sq. in. 120°L. Superheat	2. Ikeda's Water Tube Boiler with Superheater Total Heat. Surf. 5,800. sq. ft. Total Grate Area 153. sq. ft. Total Sup'h. Surf. 1,200. sq. ft. Working Pressure 200 lbs./– sq. in 120'F. Superheat.
	Maker	Uraga D. Y.	Babcock & Wilcox, Co., Ltd.	Yokohama D. Y.
Main Condenser ..	Set Type Cool. Sf.	2. N. V. Contraflo 5,574 sq. ft. Total	2. Contraflo 2,240 sq. ft. Total	2. Uniflow 2,300 sq. ft. Total

AUXILIARIES

Aux. Condenser ..	Set Type Cool. Sf.	1. M. V. Contraflo Non-Cacuum 400 sq. ft.	1. Contraflo Non-Vacuum 400 sq. ft.	1. Shiba's Patent 400 sq. ft.
Air Pump	Set Type Size	2. Kinetic Reciprocating 10″ × 17″ × 17″ × 13″	2. Kinetic Reciprocating 10″ × 10″ × 19″ × 15″	2. Weir's Dual 8″ × 14″ × 12″
Circul. Pump	Type Size	Centrifugal 8½″ × 5″ 14″ Bore	2. Centrifugal 8″ × 7½″ 13½″ Bore	2. Centrifugal 6″ × 5″ 8″ Bore
Main Feed Pump ..	Set Type Size	3. Weir's Simplex 12″ × 9″ × 24″	2. Mumford Simplex 12½″ × 9″ × 24″	2. Weir's Simplex 8″ × 6″ × 21″
Donkey Feed Pump ..	Set Type Size			1. Weir's 7″ × 5″ × 12″
General Service Pump	Set Type Size	Worthington Duplex 7″ × 5″ × 7″	Worthington Duplex 7″ × 5″ × 7″	
Ballast Pump	Set Type Size	1. Worthington Duplex 6″ × 8″ × 8″	1. Worthington Duplex 7½″ × 7½″ × 9″	1. Worthington Duplex 7½″ × 9″ × 10″
Bilge Pump	Set Type Size	1. Worthington Duplex 5½″ × 6½″ × 7½″	1. Worthington Duplex 5½″ × 6½″ × 7½″	1. Worthington Duplex 5″ × 5″ × 6″
Fresh Water Pump ..	Set Type Size	1. Worthington Duplex 4″ × 4½″ × 5″	1. Worthington Duplex 4″ × 4½″ × 5″	1. Worthington Duplex 5″ × 5″ × 6″
Sanitary Pump ..	Set Type Size	1. Worthington Duplex 4″ × 4½″ × 5″	1. Worthington Duplex 4″ × 4½″ × 5″	
Ash Ejector Pump ..	Set Type Size	1. Worthington Duplex 10″ × 5″ × 10″	Worthington Duplex 10″ × 6″ × 10″	1. Worthington Duplex 10″ × 6″ × 10″
Lub. Oil Pump ..	Set Type	2. Mumford Simplex 11″ × 9½″ × 18″	2. Mumford Simplex 9″ × 11″ × 21″	2. Mumford Simplex 5½″ × 6½″ × 15″
Dynamo Engine ..	Set Type Capacity	2. Single Cylinder Enclosed D.C. 100 V. 20 kw.	2. Single Cylinder Enclosed D.C. 100 V. 20 kw.	2. B.B.C. Turbo-Gen. & Single Cycl. Enc. 12. K.W. Turbo-Gen. 10 kw. Recipro.
Fan Engine	Set Type Size	2. Single Cylinder Enclosed 7½″ × 6″	2. Sirocco 35″ dia. Fan	1. Single Cylinder Enclosed 7″ × 5″
Trimming Pump ..		1. Centrifugal 10½″ × 7½″ 18″ Bore	1. Centrifugal 10½″ × 9″ 18″ Bore	1. Centrifugal 10½″ × 7½″ 18″ Bore
Air Compressor ..	Set Type Capacity	1. Motor Driven Portable (115 V. 3 H.P.)	1. Sentinel 25 cub. ft./min.	1. Motor Driven (100 V. 10 H.P.) 63.5 cub. ft./min.

AUXILIARIES

Oil Cooler	Set	3.	2.	2.
	Type	Surface Cooler	Surface Cooler	Surface Cooler
	Size	Cooling surface 244 sq. ft. each	1,100 sq. ft. each	96.3 sq. ft. each
Oil Grav. Tank	Set	2.	1.	
	Capacity	600 Gall's each	800 gall's each	
Oil Drain Tank	Set	2.	2.	1.
	Capacity	660 Gall's each		700 Galls
Feed W't. Heater	Set	1.	1.	1.
	Size	Contraflo Direct Contact	Surface Heater	Surface Heater
Propeller	Set	2.	2.	2.
	Type	Built up 4 Blades	Built up 4 Blades	Built up 4 Blades
	Size	10′ 9″ dia. 11′ 0″ Pitch	11′ 0″ dia. 13′ 3″ Pitch	9′ 9″ dia. 13′ 0″ Pitch

DECK MACHINERY

Windlass	Set	1.	1.	1.
	Size	9″ × 9″ × 12″	9½″ × 9½″ × 12″	9½″ × 9½″ × 12″
Fore St'r. Engine	Set	1.	1.	
	Size	8″ × 8″ × 9″	9″ × 9″ × 8″	
Aft. St'r. Engine	Set	1.	1.	1.
	Size	9″ × 9″ × 10″	9″ × 9″ × 9″	8″ × 8″ × 8″
Capstan Engine	Set	2.	2.	2.
	Size	8½″ × 8″ × 11″	10″ × 10″ × 9″	8″ × 8″ × 12″
Boat Winch	Set	1.	1.	
	Type	Motor 100 V. 7.5 H.P.	Motor 100 V. 18. H.P.	

The buffers used for the goods cars were applied behind the wooden fender to resist the concussion of vessels at the time of berthing.

In the ferry connection of laden cars on land and boat, a hinged bridge is provided, so as to transfer the cars freely and easily without any effect of tidal fluctuations. The bridge is a through girder, 80-ft. long and 30-ft. 6-in. wide, hinged on the land side. On the other side stand steel towers to which the movable end of the girder bridge is attached by the screw rods. By means of gears the rods are connected with a 50 h.p. motor on the tower, thus controlling the motion of the girder end up and down. To counterbalance the weight of the girder a balance weight is connected with the movable end by a chain which passes through the pulley attached to each side of the upper part of the tower. The bridge end is raised from its lowest to the highest point (15-ft. 10-in. in range) at the rate of 3-ft. per minute.

An apron girder, 20 feet in length, is attached to the movable end of the main bridge, and the rails on this apron are connected with those on the boat.

The other important equipment on land is as follows:
1. Passengers' waiting room for ferry boat, and other necessary conveniences.
2. Marshalling yard.

In connection with the ferry service, some needed improvements were made in track arrangment in Aomori station. Among other necessary improvement works the most remarkable was carried out in the newly established waiting room for ferry boat and platform.

The waiting room is so arranged as to enable the passengers to go directly on board the ship by a gallery from the upstairs. It is a two-storied wooden building, its floor being covered with Lypruth's linoleum. The area of the whole building is respectively divided as follows: The ground floor to be used for third class accommodation, 210 tsubo; the upper floor for the first and second class accommodation, 220 tsubo; and a shed for passage to platforms, 138 tsubo.

The platforms are located between the main building and the waiting room, one for the N-E. Main line and the other for the Ou line, each 950 ft. in length and 33 feet. in width.

The marshalling yard was newly established between Aomori and Ura-machi, 0.7 m. distant from Aomori station, as there was no room for enlargement. The area of the yard, with the daily sorting capacity of 600 vehicles, covers about 139,000 tsubo, the total length of lines amounting to 20½ m.

(B) EQUIPMENT AT HAKODATE STATION

(*a*) Quay wall

The principal equipment on the Hakodate side is as follows:
1. Pier
2. Transfer bridge

The quay wall is so arranged as to moor two boats at the same time and measures about 600 feet. in length, and 250 feet. at the widest part.

The attachment of the fender and the device against the shock of boat and also the construction of transfer bridge are the same as those at the Port of Aomori.

(*b*) Equipment on Land

The principal equipment on land is as follows:
1. Passengers' waiting-room for ferry boat, and other necessary conveniences.
2. Rearrangement of tracks in the station compound and other improvements.

The waiting-room is a two-storied reinforced concrete building with the construction area of 449 tsubo, from where the long galleries, 467 feet. long each, lead to the ship's side. Between the quay wall side and the platform under the waiting-room there is an underground passage, and an elevator is equipped for the conveyance of baggage and parcels.

As a convenience the lines were extended from Hakodate station to the pier, to enable passenger trains to run there and the new arrangement of tracks for goods cars is shown in the attached Plan III.

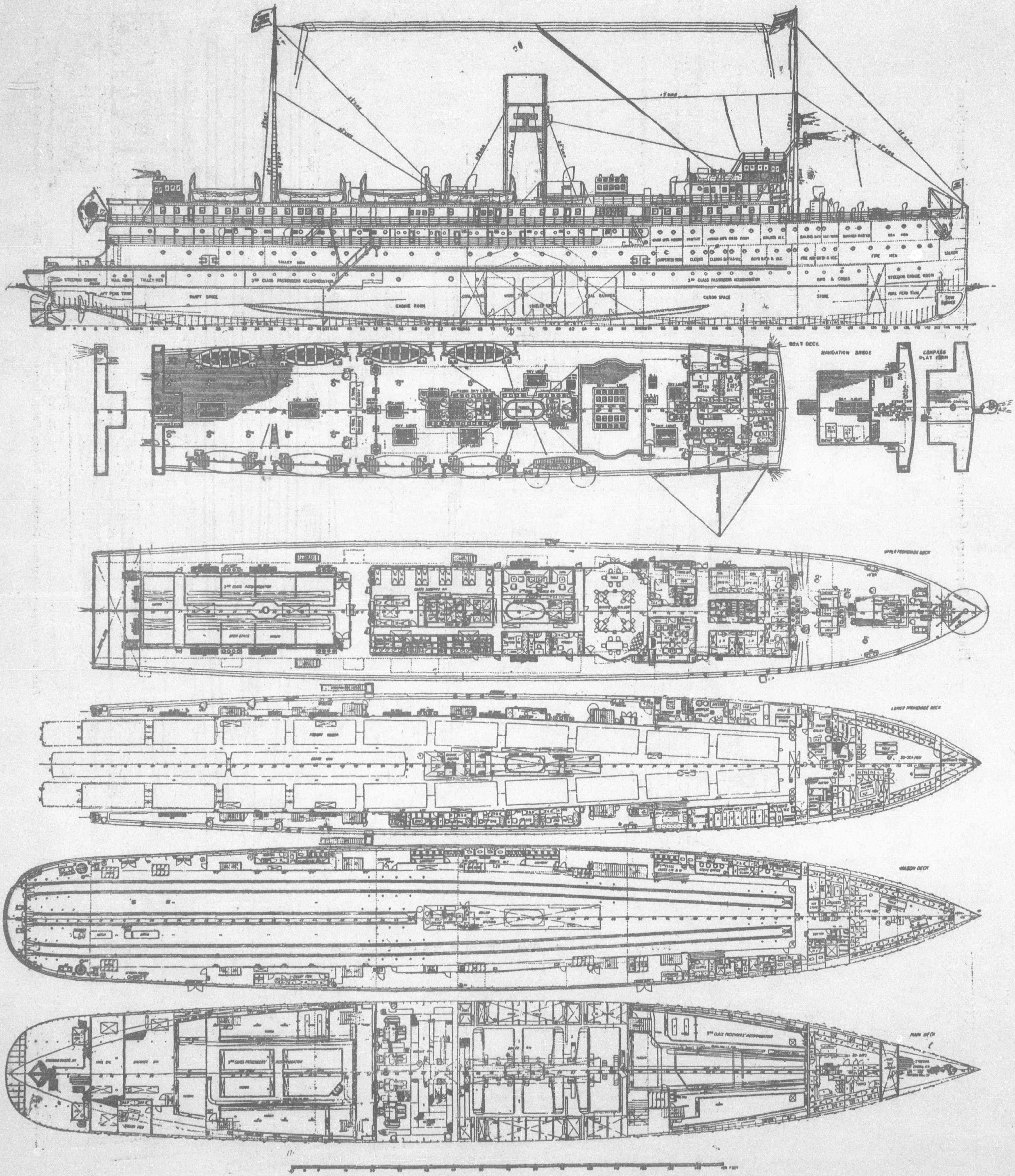
NEW FLOTILLA LEADER:—Messrs. Yarrow and Co., Ltd. have received an order from the Royal Yugoslav Government for the construction of a powerful Flotilla Leader. The propelling machinery consists of turbines in conjunction with Yarrow Patent Water-tube Boilers and the vessel is being equipped with the latest improvements in every respect.

Displacement about	2,400 tons.
Dimensions	371-ft. 6-in. × 35-ft. 0-in. × 22-ft. 9-in.
S. H. P.	42,000
Guns	4—5½-in.
Torpedoes	2 triple.

This is the largest and most powerful Flotilla Leader ever built in Great Britain either for the British or any foreign Navy.

Plate 1: Plans of Four Railway Ferry Boats for the Japanese Government Railway Service Between Aomori and Hakodate

The "Shoho Maru" and "Hiran Maru" were Built by the Uraga Dock Co. Ltd., and the "Tsugaru Maru" and "Matsumae Maru," by the Mitsubishi Shipbuilding and Engineering Co. Ltd.



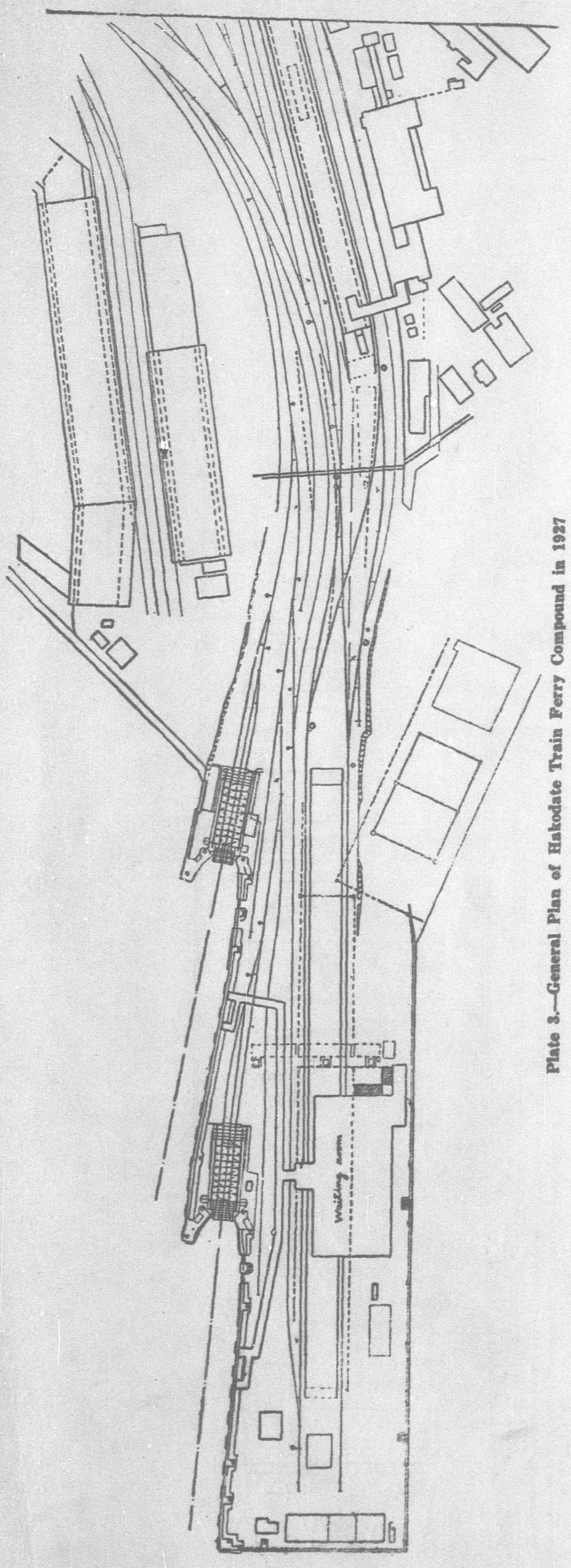
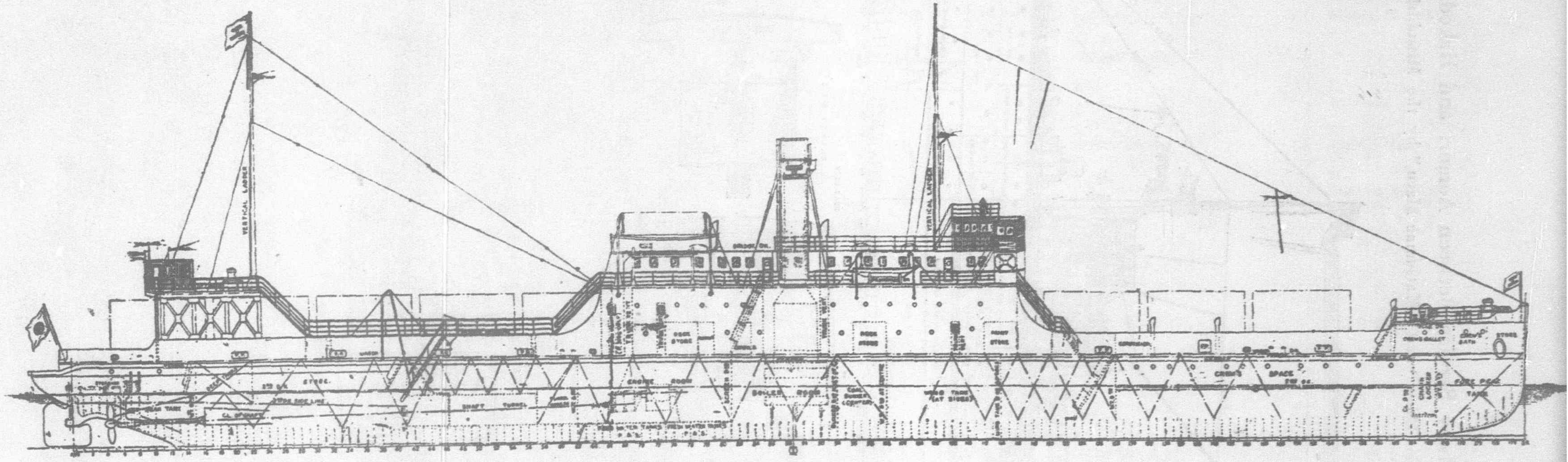


Plate 3.—General Plan of Hakodate Train Ferry Compound in 1927

Plate 2: Japanese Government Railway Ferry Boat T. S. S. "No. 1 Seikan-Maru"

Built by the Yokohama Dock Co. Ltd.



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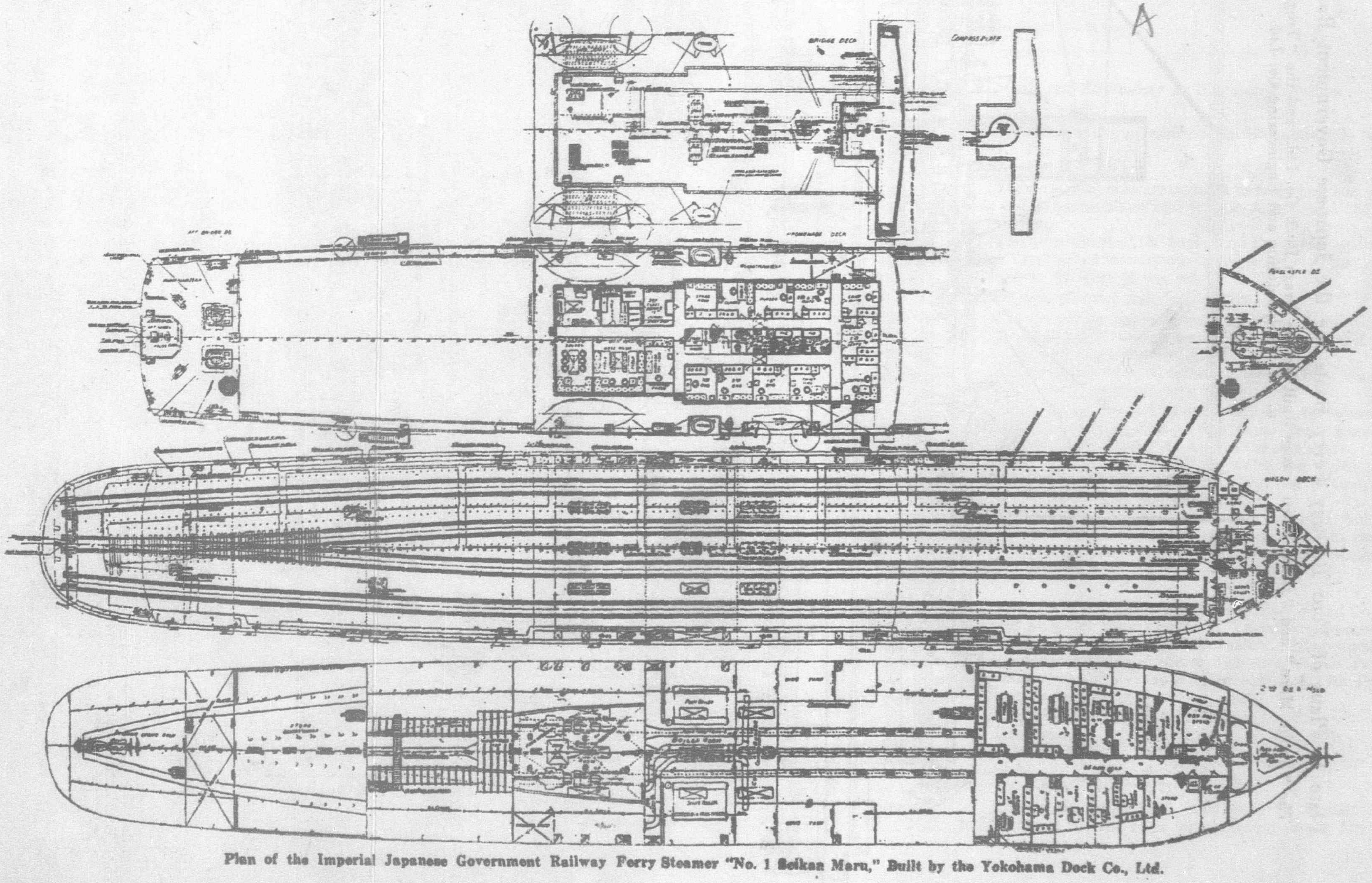
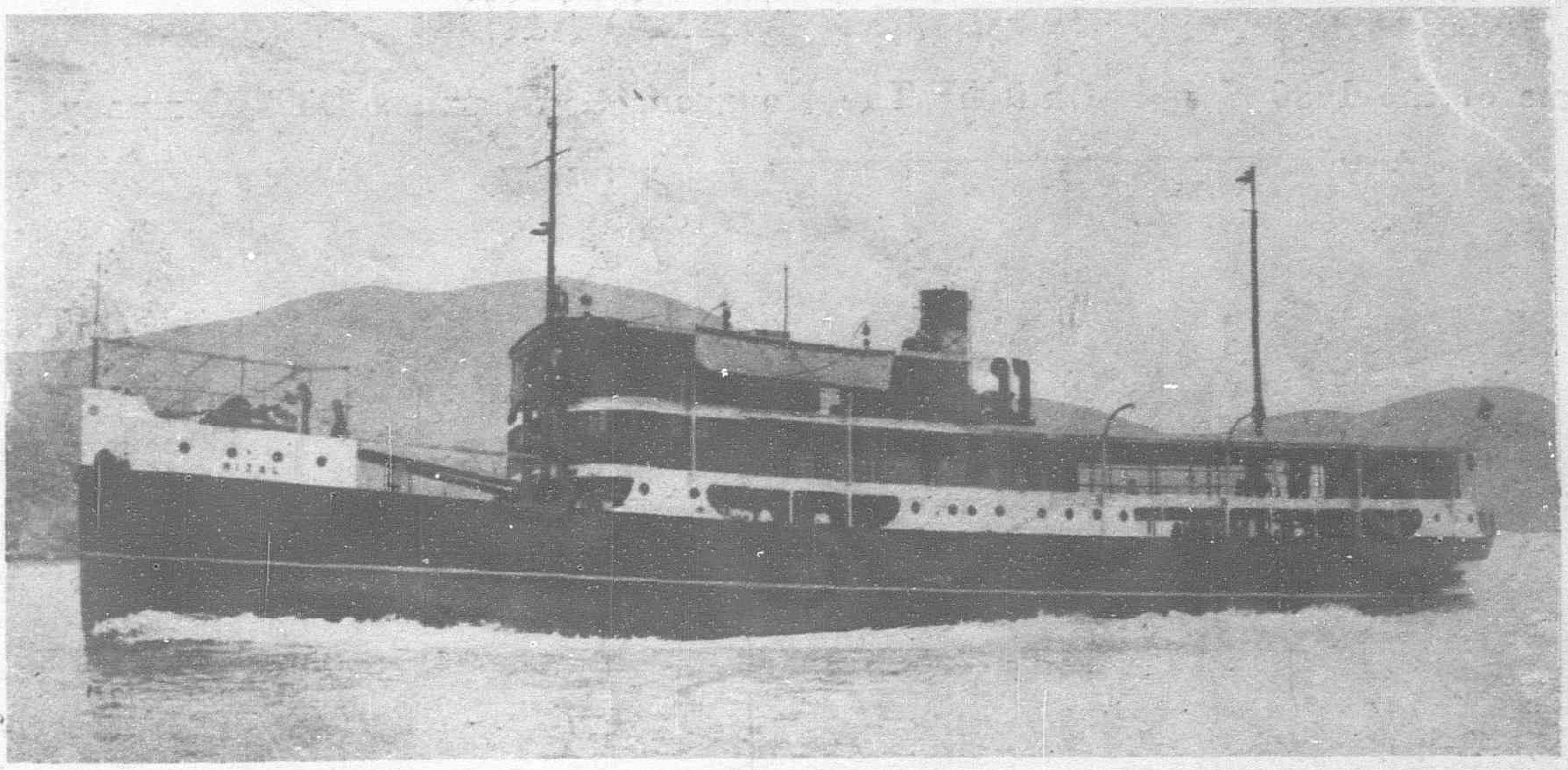


Plan of the Imperial Japanese Government Railway Ferry Steamer "No. 1 Seikan Maru," Built by the Yokohama Dock Co., Ltd.

B



M. V. "Rizal," Steel Single Screw Motor Vessel. Dimensions:—170-ft., b.p. by 20-ft., by 12-ft., 7-in., Mld., D.W. 620 Tons B.H.P. 770. Speed 12.22 Knots

A Busy Shipyard

Activities of the Hongkong & Whampoa Dock Company, Ltd.

Out of a total of thirteen vessels launched at the Kowloon yards of the Hongkong & Whampoa Dock Company, Ltd., during 1930, six were equipped with Diesel engines and two engines were made by the Dock Company.

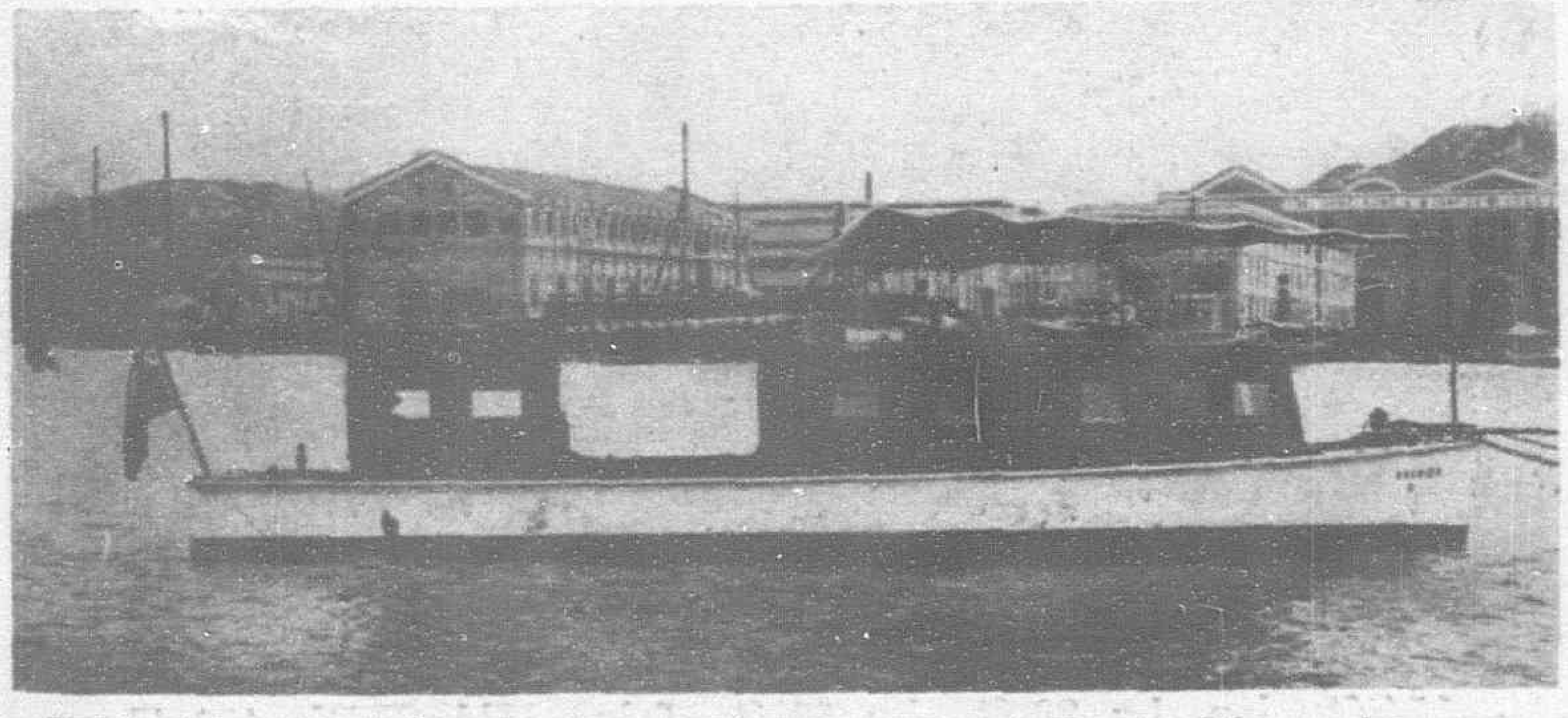
The launchings for 1930 included:

2 Steam Ferries
2 Motor Launches
1 S.S. Passenger and Cargo Vessel
1 S.S. Motor Cargo Vessel
1 Lighter
1 Dumb Lighter for Fuel Oil
1 T.S. Motor Vessel for Passenger and Cargo
1 S.S. Motor Tug
1 Fire Float
1 T.S. Launch
1 Teakwood Hull

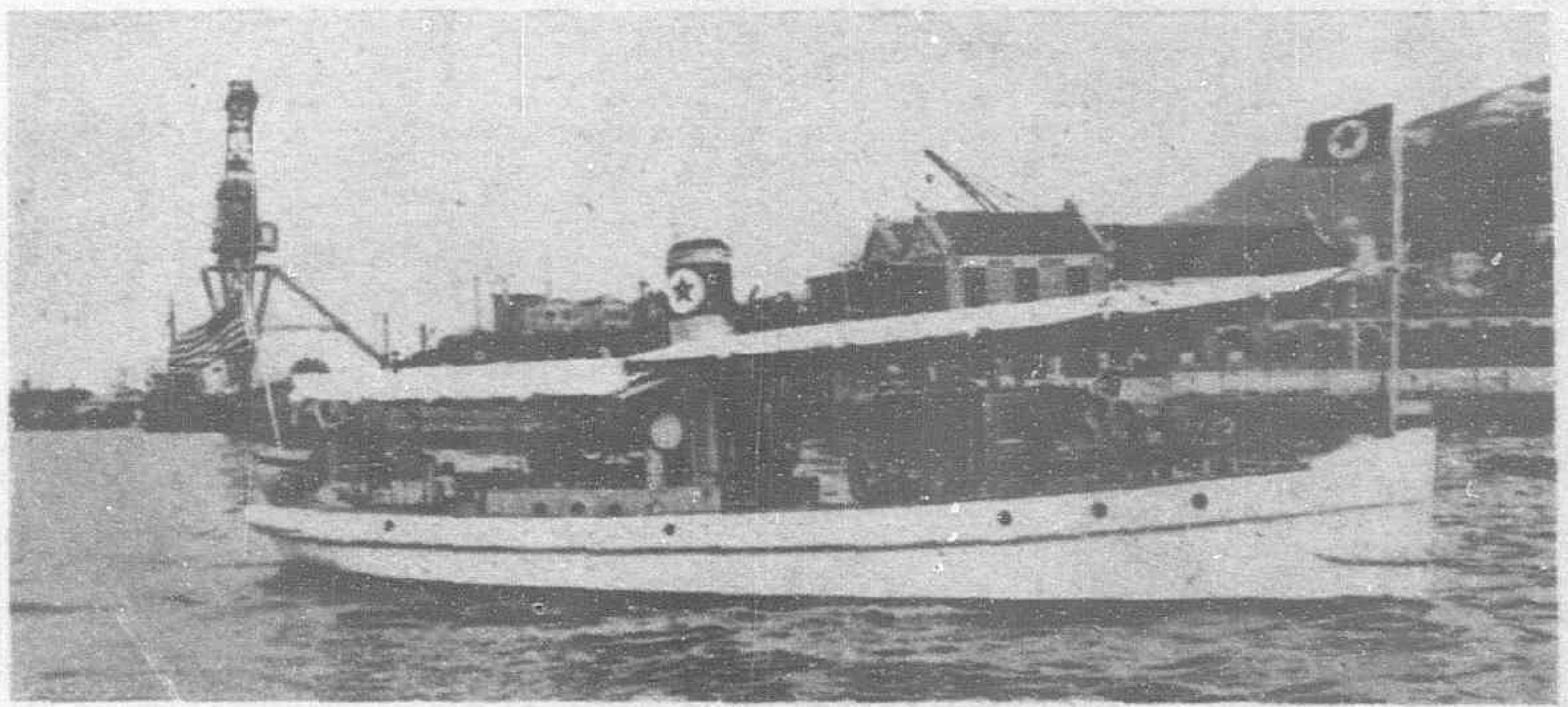
The total horse-power of these vessels is 2,247.84 and it is interesting to note that two are destined for the Philippines and the Dumb Lighter is for Sydney, Australia.

The names of the above vessels, with their tonnage, horsepower and make of engines follow:

Name of Vessel	*Type*	*Port of Reg.*	*Gross Tons*	*I.H.P.*	*Makers of Engines*
Man Tack	S.S. Steel D.E. Steam Ferry	Hongkong	167.66	740	H.K. & W. Co., Ltd.
Man Chi	do.	do.	167.66	740	do.
Texaco II	Teakwood Motor-Launch	do.	25.49	72 b.h.p.	Gardner Full Diesel
Kurimarau	S.S. Steel Passenger & Cargo Motor Vessel		288.27	330 b.h.p.	Deutz Full Diesel
Sta. Teresita	S.S. Steel Motor Cargo Vessel	Iloilo	213.82	200 b.h.p.	Atlas Polar Full Diesel
Courier	Teakwood S.S. Motor Launch	Hongkong	15.00	25 b.h.p.	Deutz Diesel
Reg. No. 556	Steel Cargo Lighter	do.	130.00	—	—
Wayfoong	New Teakwood Hull	do.	39.94	120 i.h.p.	H. K. W. Dk. Co., Ltd.
Not Named	500 ton Fuel Oil Dumb Lighter	Sydney	300.00	—	—
Kanloan	T. S. Passenger & Cargo Motor Vessel	Iloilo	500.00	1,540 b.h.p.	Atlas Diesel
Not named	Teakwood Motor Driven T. S. Fire Float	Hongkong	70.00	220 b.h.p.	Twin set Gardner 6 k.m.
Not Named	Wooden T. S. Motor Launch	do.	20.00	280 b.h.p.	Thornycroft Type RB/6.



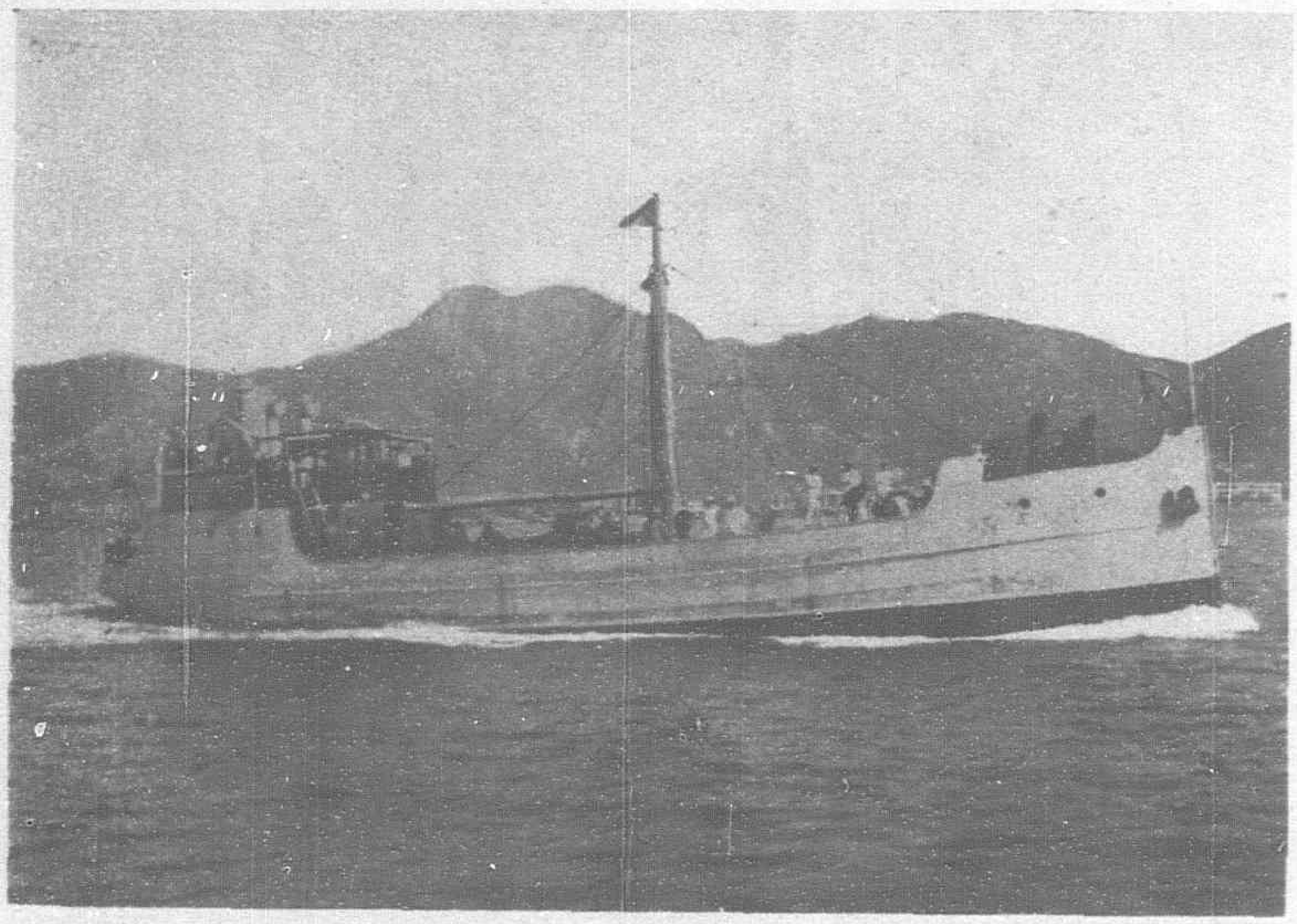
M.B. "Courier," Single Screw Wooden Motor Boat. Dimensions:—41-ft., 3-in., b.p. by 10-ft. by 4-ft. Mld. B.H.P. 25. Speed 7.5 Knots



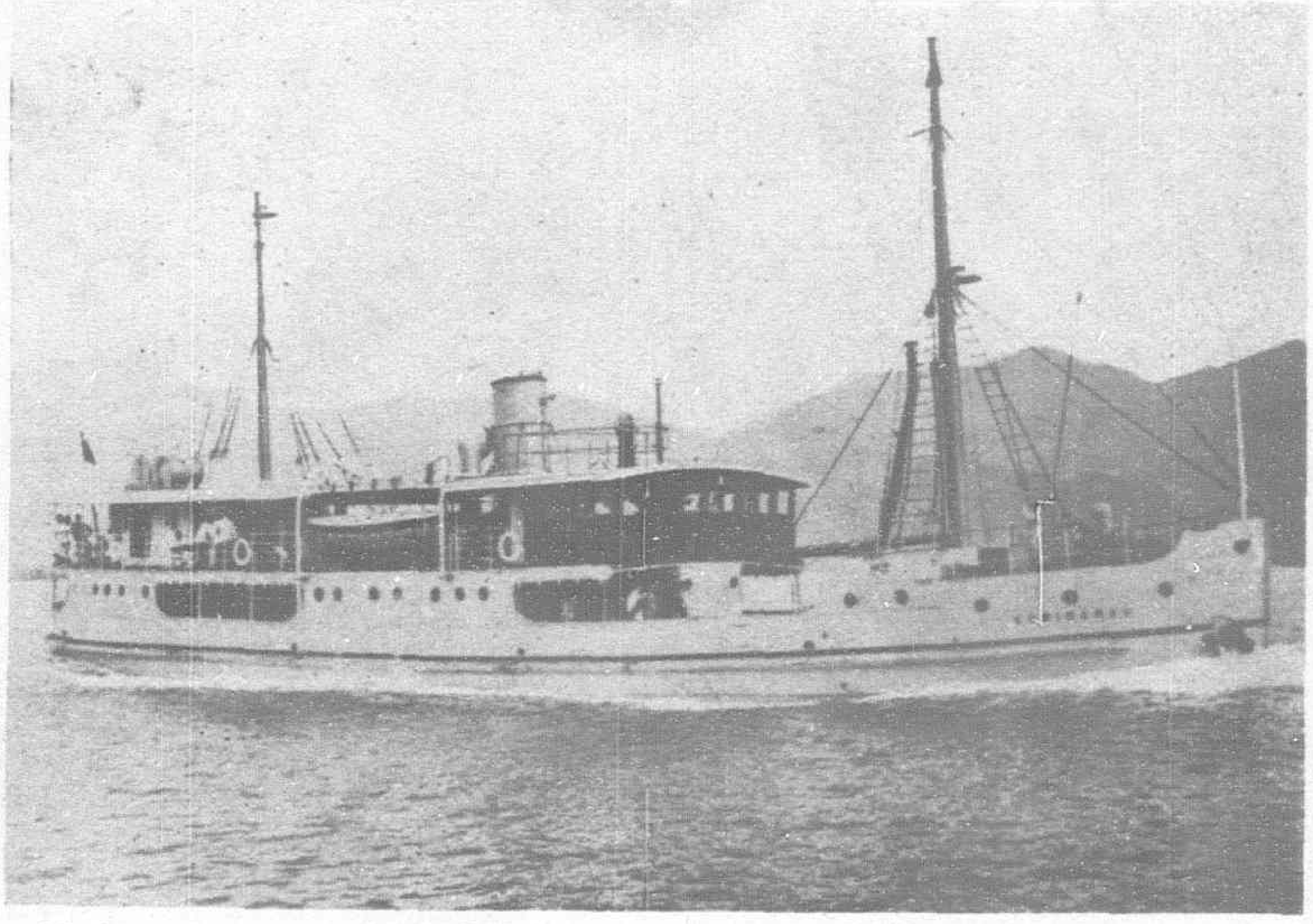
M.L. "Texaco II," Single Screw Motor Wooden Launch. Dimensions:—55-ft., b.p. by 13-ft., by 6-ft., Mld. B.H.P. 72. Speed 9 Knots

A BUSY SHIPYARD

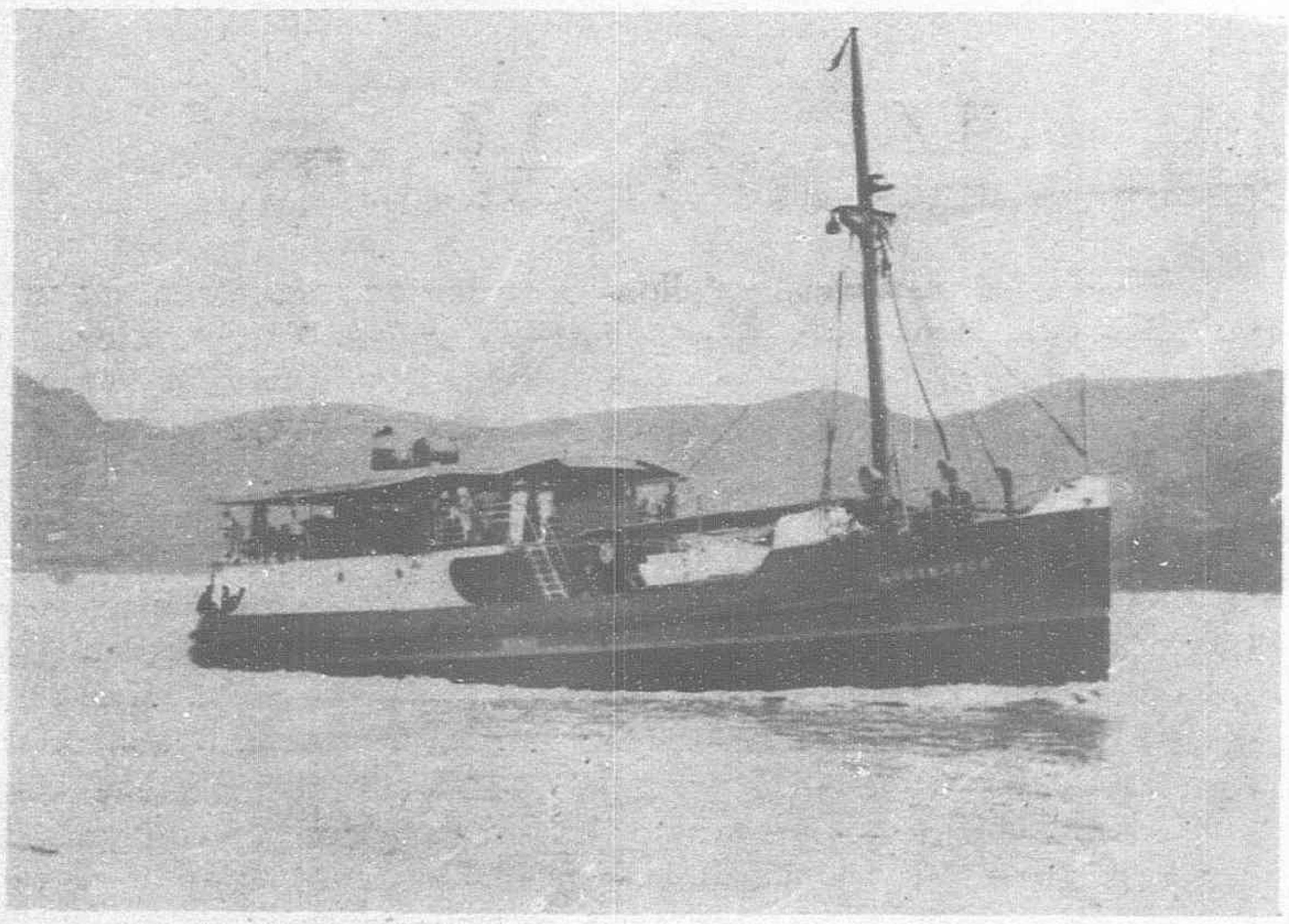
Some of the 1930 Vessels Built by The Hongkong & Whampoa Dock Company, Ltd.



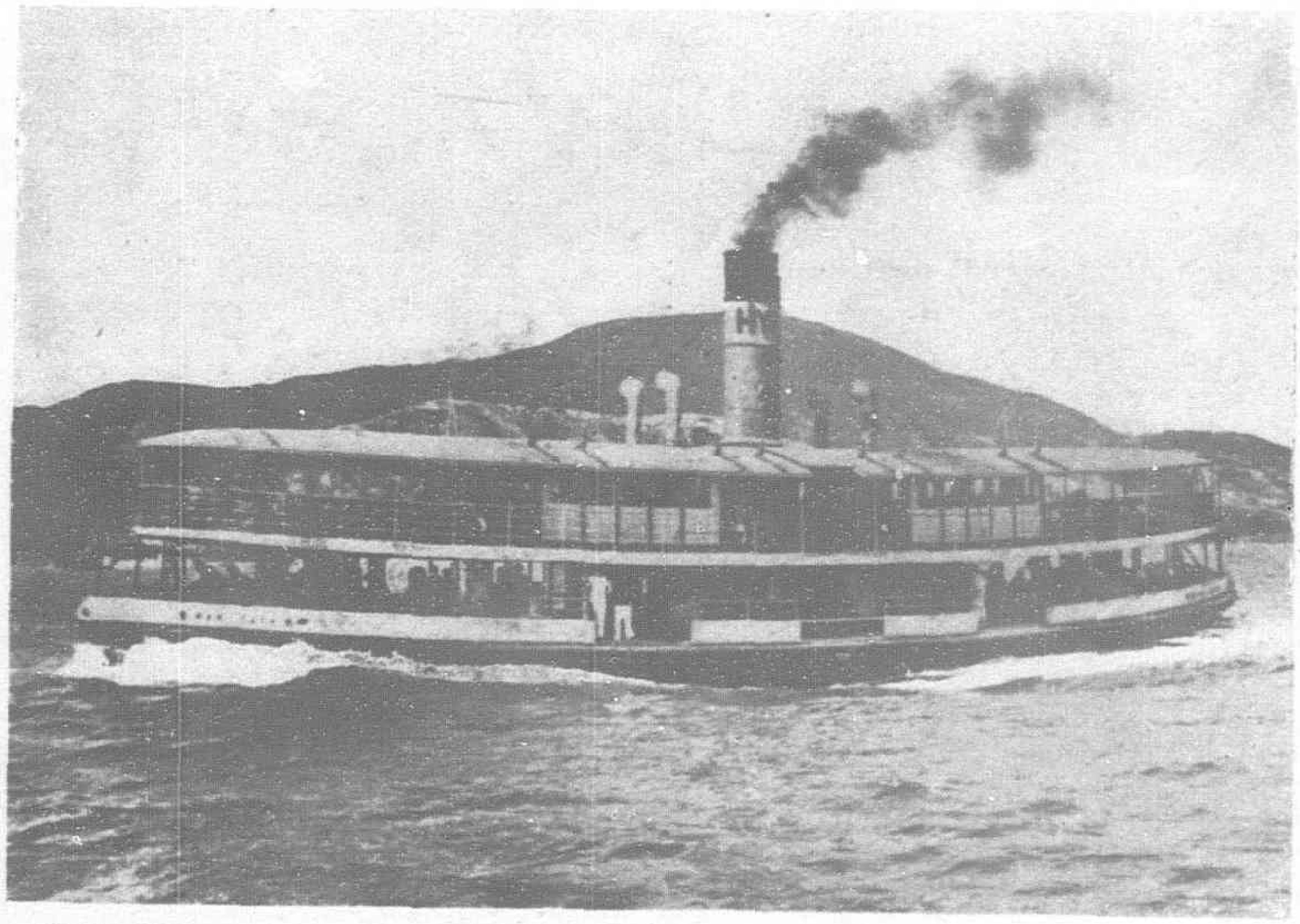
M.V. Sta. Teresita," Steel Single Screw Motor Vessel. Dimensions:—120-ft., b.p. by 24-ft. by 8-ft., 6-in., mld. D.W. 290 Tons, B.H.P. 200. Speed 8.65 Knots



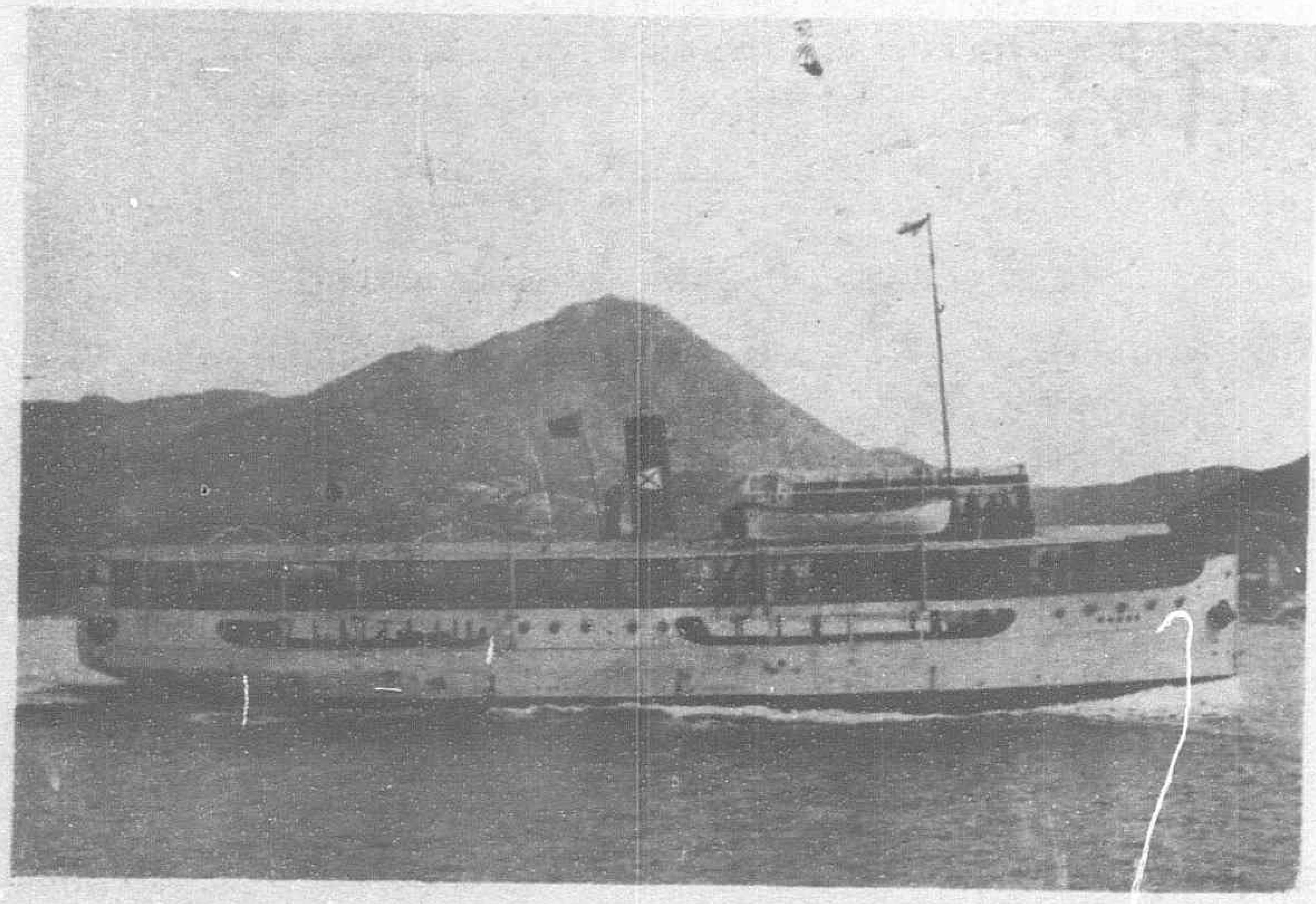
M.V. Kurimaran," Steel Single Screw Motor Vessel. Dimensions: 125-ft., b.p. by 25-ft. by 10-ft., 6-in., Mld. D.W. 310 Tons, B.H.P. 330. Speed 9.55 Knots



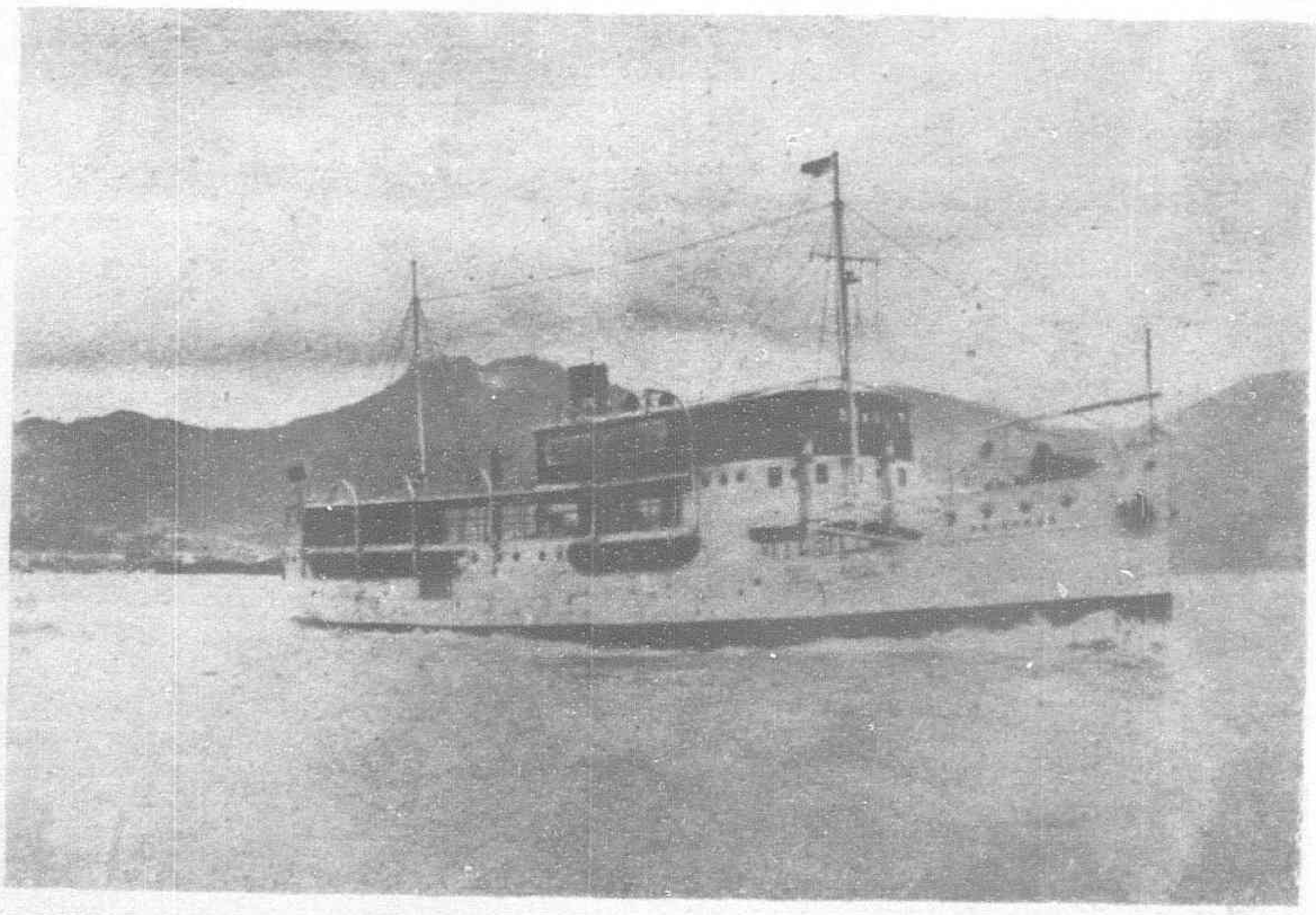
M.V. "Lusteveco," Steel Single Screw Motor Vessel. Dimensions: —95-ft., b.p. by 24-ft., 10-ft., Mld. D. W. 194 Tons. B.H.P. 225. Speed 9.5 Knots



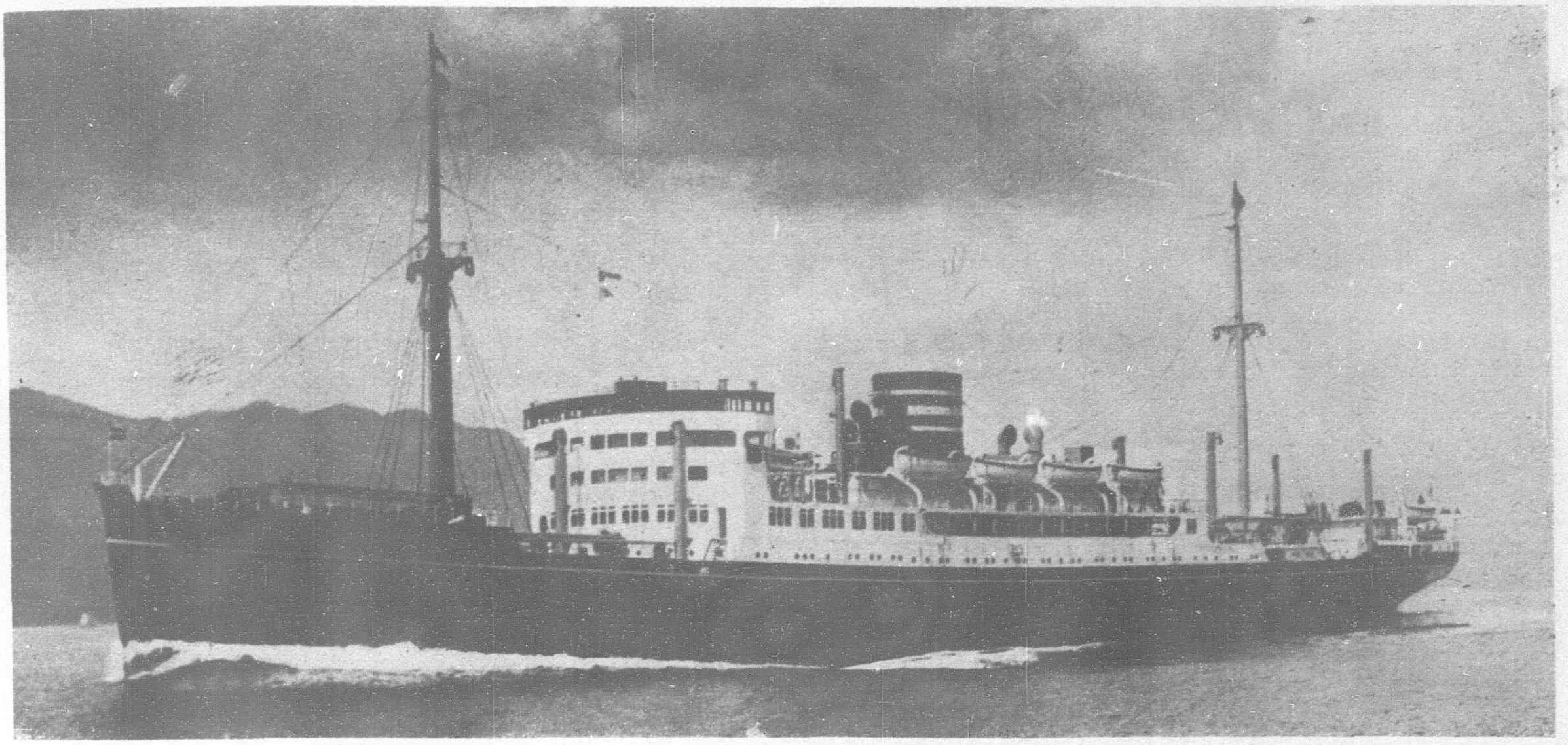
S.S. "Man Tack," Steel Single Screw Double Ended Ferry. Dimensions:—110-ft., b.p. 28-ft. by 10-ft., 9-in., Mld. I.H.P. 745. Speed 11.19 Knots



M.V. "Manok," Steel Single Screw Motor Vessel. Dimensions: —134-ft., b.p. by 27-ft., by 11-ft., 2-in., Mld. D.W. 272 Tons, B.H.P. 330. Speed 9.55 Knots



M.V. "Princesa," Steel Single Screw Motor Vessel. Dimensions: —154-ft., b.p. by 28-ft., by 11-ft., 6-in., Mld. D.W. 466 Tons, B.H.P. 575. Speed 11.82 Knots



New N.Y.K. Cabin Motor Liner "Heian Maru" Built by the Osaka Iron Works

N.Y.K. Motor Vessel "Heian Maru"

THE latest addition to the N. Y. K. fleet the *M.S. Heian Maru* now on her maiden voyage to Seattle, marks the completion of the renovation plans of the N. Y. K.

These new Cabin motor ships more fully described on the June Issue of the *Far Eastern Review*.

The *Heian Maru* is a twin-screw vessel of 20,500 tons displacement, built by the Osaka Iron Works, and is equipped with two sets of double acting Burmeister and Wain Diesel engines, capable of maintaining an average speed of 18 knots. Her length overall is 535-ft., breadth 66-ft. and depth 4-ft., as far as outward appearance and functions are concerned the exact replica of her sister ships *Hikawa Maru* and *Hiye Maru*. The furnishings, however, of the *Heian Maru* are completely different. Whereas Messrs. Marc Simon et Cie. of Paris took charge in this respect of the *Hikawa Maru* and *Chichibu Maru*, giving them a touch of French Futurism, the *Heian Maru* has the stateliness and calm of " dear old London." having been furnished jointly by Messrs. Wylie & Lochhead, Ltd., and Messrs. Heaton, Tabb & Co., of that city. This is appropriate, in that Heian used to be the former name of Kyoto when that ancient city was established in 200 A.D. Moreover, it is the name of that impressive shrine in the ancient capital "Heian Jingu," one of the guardian gods of Japan and to which even to-day people turn for strength when faced with national crises. Again, the words " Hei-An " mean literally " Peace and Security ; and as a name of a ship what can be more befitting ?

To live up fully to its name, the *Heian Maru* has (besides the regular apparatuses for passengers' safety, including life-boats, wireless and searchlights) the " Scott-Ross " system of water-tight doors, electrically controlled from the bridge in case of emergency, the Rich-Lux fire-detecting and extinguishing system, automatic fire alarms and a complete collection of safety devices. For ventilation, the " Punkah Louvre " system of hot and cold air which proved such a success on the *Asama Maru*, is adopted. This does away with electric fans and steam heaters. Only diffused light is used.

The *Heian Maru* and her two sister ships are, therefore, smokeless and non-vibrating vessels, as steady as battle ships. These vessels on the northern route possess elaborate equipment for holding a great amount of cargo, in view of the rapidly-increasing trade between Seattle, Vancouver and the Orient.

Regarding passenger accommodation, the *Heian Maru* follows the plan of her sister ships, having Cabin Class, Tourist cabin and Steerage.

These class distinctions follow in general those found on the trans-Atlantic liners and their adoption on the Pacific marks a new epoch on this side of the globe. It is, in a way, a cutting-down of prices—not with inferior goods but with far better merchandise.

The cabin-class passenger quarter, both staterooms and public rooms, are arranged on the central part of " A " and " B " decks. There are altogether thirty-four staterooms, many with private baths attached, including a Suite de luxe and a number of single-bedded cabins. All are outside rooms, with large windows or portholes opening direct on to the sea, and are provided with regular full-length beds with Simmons Beautyrest spring mattresses. They are unusually spacious and are furnished with dressing tables, bedroom chairs and wash-stands with hot and cold running water.

The tourist cabins are arranged on the after-part of the " C " deck. There are 23 cabins of this class, of which for two persons, five for three and nine for four ; making a total capacity of sixty-nine adults. The public rooms and other parts of the accommodation and the cuisine are as good as second-class in any other trans-Pacific passenger liner, and with the low rates charged will be a great benefit to those wishing to travel economically.

Japanese Naval Construction

On the basis of the London Naval Treaty, the Japanese Navy is appropriating Y.247,080,000 on a six years' program from the next fiscal year. The warships to be built comprise altogether 39 in number, including four cruisers, 12 destroyers, nine submarines, one mine-layer and others of minor sizes.

The allocation of the building contracts to the different Naval Yards and shipbuilding companies is as under :—

(1) Four 8,500 ton class cruisers : one each for Kure Naval Yard, Yokosuka Yard, Kawasaki (Kobe) and Mitsubishi (Nagasaki) Yards.

(2) Twelve 1,400 ton class destroyers : three each for Sasebo and Maizuru Yards, and two each for Ishikawajima Dockyard, Uraga Dockyard, and Fujinagata Yard.

(3) Nine submarines : one (900 ton class) and two others for Kure Yard, two for Yokosuka Yard, and two each for Kawasaki (Kobe) and Mitsu (Nagasaki) Yards.

(4) One 5,000 ton class minelayer for Yokohama Dockyard.

China May Buy Ten Warships

Information emanating from reliable Chinese sources has it that the Ministry of the Navy of the National Government has decided to purchase from a certain European power ten men-of-war as its preliminary step towards the completion of the Chinese naval strength.

It is understood that of these ten warships, six are light cruisers of the 5,000 ton class and four gun-boats, and that as the present plan stands, three of them are to be purchased by the end of the current year and the dealing in the rest will be effected within the next few years, owing to financial circumstances.

It is further reported that the total price of the ten warships is estimated at approximately £5,000,000.

By arrangement with the Japanese Government, a party of four delegates from the Ministry of Navy left for Japan on January 19 to investigate the operation of naval dockyards in that country.

What Gas is Doing for Manila

(Continued from page 45).

that already considerable benefits to our distribution system have been derived. So much may be said about the manufacture of gas.

The gas supply system was extended last year to the Municipalities of San Pedro Makati, Paraffaque and Baclaran, and for this year we propose to supply gas to part of Caloocan and San Jaun del Monte, requiring a total of five kilometers High Pressure Pipe Lines and 25 kilometers of ordinary main pipes, entailing a cash expenditure of about $200,000 including gasmeters, service-connections and house installations.

In order to demonstrate to the public our well assorted stocks of all kinds of modern gas appliances for household and industrial use, we have moved our down-town display room to more spacious quarters in the Roxas Building at Calle David. There our customers and prospective buyers will find a complete line of gas ranges and hot water heaters from which they may choose what is best suited to their taste and requirements. I think I am not saying too much when I state that the splendid and inexpensive service given by our Piccolo heater and automatic water heaters is certainly appreciated by most of you. Lately we went also in the refrigeration business with our gas heated "Electrolux Servel Refrigerator." Its silent and economical operation appeals to an increasing number of gas customers.

If you would like to visit our plant some day, I would be very happy to show you around.

I thank you for this privilege of telling you something of the work we are doing to help Manila grow, as Ted Hall said last week.

South China Motor Shipbuilding Works

The shipyard of the South China-Motor-shipbuilding and Repairing Works, Ltd., which was opened a few months ago and all the plant and machinery of which has been purchased from Europe at a very reasonable rate of exchange, is now in full working order. As the preliminary organization is completed, the Shipyard may now embark on further lay-out.

The shipyard has not been idle during these few months, as already two smaller craft have been built and two further orders have been received, besides the two motorships which are now under construction and the keels of which were laid down on January 13. Besides this new construction there is repair work in hand, giving the new company a good start.

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FED. INC., U.S.A.
CONSULTING ENGINEERS
MARINE & CARGO SURVEYORS
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INTERNATIONAL UNION OF MARINE INSURANCE
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SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

4 AVENUE EDWARD VII.

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上海愛多亞路四號
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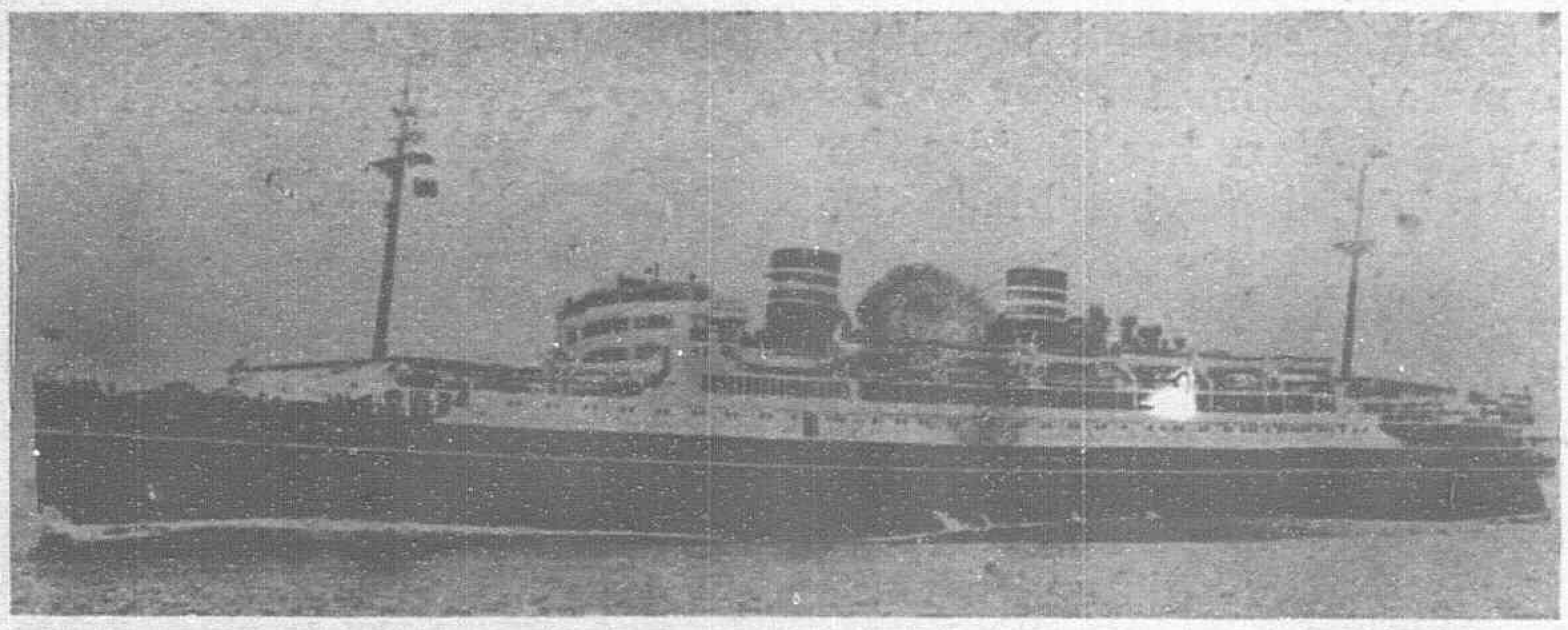
垂詢工程事務亦曷誠酬答



N.Y.K. Motor Liner "Asama Maru" Propelled by Four 8-cylinder Sulzer Two-cycle Diesel Engines Totalling 16,000 B.H.P.

Other Products:

Steam Engines and Boilers, Air and Gas Compressors, Centrifugal Pumps and Fans, Borehole Pumps, Stationary and Marine Diesel ngines, Ice-making and Refrigerating Plants, Maag Gears and Maag Planing Machines.

WINTERTHUR. SWITZERLAND.